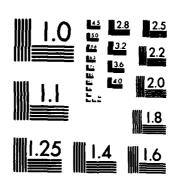
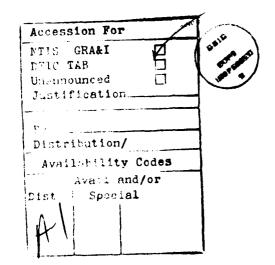
COMPUTER OPERATIONS STUDY OF RESERVOIR OPERATIONS FOR SIX MISSISSIPPI RIVER HEADWATERS DAMS APPENDIX A(U) ANDERSON-NICHOLS AND CO INC PALO ALTO CA JUN 82 PGG 13/2 AD-A147 015 1/3 UNCLASSIFIED NL t.



Prepared for ST PAUL DISTRICT CONTRACT NO. U.S. ARMY CORPS OF ENGINEERS DACW37-81-C-0027 015 **COMPUTER OPERATIONS** AD-A147 STUDY OF RESERVOIR **OPERATIONS MISSISSIPPI HEADWATERS DAMS APPENDICES JUNE 1982** This document has been approved for public release and sale-its distribution is unlimited.

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A

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APPENDIX A

SCOPE OF WORK

APPENDIX "A" CONTRACT SERVICES TO UNDERTAKE STUDIES AND PREPARE A REPORT ON THE EFFECTS OF DIFFERENT OPERATING PLANS FOR THE SIX MISSISSIPPI RIVER HEADWATERS DAMS

SCOPE OF WORK

1. GENERAL

The work effort under this scope of work will be directed toward reevaluating the effects of four operating plans already developed in a previous contract and six additional operating plans for the six Mississippi River Headwaters Dams. The previous work which was accomplished by the St. Anthony Falls Hydraulic Lab, University of Minnesota, utilized an early version of the Hydrologic Engineering Center's (HEC) HEC-5c Computer Program. HEC is a Corps of Engineers Research and Training Facility located at Davis, California.

The work desired under this scope of work will utilize the new HEC-5 model developed by the HEC, and will culminate in a final report which will summarize the hydraulic and economic effects of implementing each of the evaluated plans. The final report will be required for a public meeting, and the Contractor will provide the necessary exhibits to summarize the computer work for the public meeting. The contractor will attend the public meeting to answer questions from the public on the computer study.

REQUIREMENTS

The contractor is required to utilize the new HEC-5 Model. The model will be modified as appropriate to evaluate the six Mississippi River Headwaters lakes operation and related effects on five river control points. The model development will be accomplished on the Lawrence-Berkely-Lab system or in-house Harris 500 computer system, at the discretion of the contractor. However, the final model will in any event be transferred to the Harris 500 system for subsequent use by the St. Paul District, after completion of this contract.

The contractor is required to utilize the modified HEC-5 computer model to reevaluate four operating plans previously prepared for the six Mississippi River headwaters dams and evaluate six new operating plans as described in Exhibit 1 attached, and to prepare a summary report. The summary report is required by the government to aid in preparing a stage III feasibility report. The summary report will be completed by November 1981.

The contractor will also conduct and summarize the results of a sensitivity analysis involving the HEC-5 model. The sensitivity analysis will determine how a modification to the six lake area-capacity curves would impact on the downstream control points for the evaluated operating plans. Based on the sensitivity analysis, the contractor will make a recommendation as to the need for a field survey to more accurately define the area-capacity curves presently in use.

POLICY GUIDELINES

Technical factors will be given adequate consideration in the application of the HEC-5 computer program to the operating plans evaluated for the six Mississippi River Headwaters Dams and five downstream control points (see exhibit 2). Flow data for all control points and elevation or stage data for the six headwaters lakes and Aitkin are available on tape, as developed by the University of Minnesota's St. Anthony Falls Hydraulic Laboratory (SAFHL). The required work will utilize existing data to the greatest extent possible.

4. DATA FURNISHED BY THE GOVERNMENT

- a. January 1977 Plan of Study.
- b. August 1979, Report and Appendixes by the St. Anthony Falls Hydraulic Laboratory, "The Effects of Different Operating Plans for the Six Mississippi River Headwaters Dams, Part I."
- c. September 1979, Report and Appendixes by the St. Paul District, Corps of Engineers, "Mississippi River Headwaters Lakes Study."
- d. Revised elevation-damage curves or data for eight required damage control points.

- e. HEC-5c model on tape, computer cards, and computer output in binders. (This material was developed in a 1977-1979 analysis of four operating plans by the St. Anthony Falls Hydraulic Laboratory.) The HEC-5c model data are provided only to familiarize the contractor with the prior work completed under contract. The contractor must use the new version of HEC-5 as previously discussed under section 2, "Requirements."
- f. Copies of other reference material, maps, and plates relevant to the study and available to the St. Paul District.
- g. Access code and account number with the Lawrence-Berkeley Laboratory in California for the contractor's use. (The government will absorb the computer charges for all work required under this scope of work.)

5. STUDY REQUIREMENTS

- a. <u>Conferences and Meetings</u>: The contract price will include six meetings with the Contracting Officer's representative during completion of the contract. The contractor's representative shall attend these meetings and present data as required. Four of the six meetings would be held in St. Paul and two at the HEC office in Davis, California.
- b. <u>Computations</u>, <u>Working Drawings</u>, <u>and Supporting Data</u>: Computations, working drawings, and supporting data will be developed, as specified in other sections of this appendix, to the detail that they will form a sound basis for conclusions reached on the hydraulic effects of various operating plans and permit adequate detailed review by the Contracting Officer.

The contractor will provide the Contracting Officer with a copy of the HEC-5 computer output at the completion of runs for each operating plan. This output is required for review by the St. Paul District's Hydrology Section. This output should be put on file on the Harris System, to be assessed by District personnel directly after being informed by the contractor that the run is complete. All computations, working drawings, renderings, and supporting data developed during the preliminary and final study efforts will become the property of the Government and will be furnished to the Contracting Officer.

c. Report Documents: The general format and outline of the required report will be the responsibility of the contractor. The contractor will develop a report outline and draft sections of the report and furnish them to the Contracting Officer for review. The draft sections will be double-spaced but otherwise will follow the format and coverage as best suited to presenting the study results.

After review, the Contracting Officer will indicate items requiring revision, and the contractor will edit and make the necessary changes and prepare the corrected draft sections previously submitted. The final preparation, printing, and assembly of the required report will be accomplished by the contractor.

At least 25 copies of the study report will be prepared by the contractor and submitted to the Contracting Officer. The report should be bound in final (single-spaced form) with all maps, photographs, figures, and tables included. The report pages will be 8½ by 11 inches or suitable multiple measurements of these dimensions, and be capable of being xeroxed.

d. Government Review: In addition to a monthly review and analysis meeting, Government formal review will take place upon completion of the report.

6. SCHEDULE

The required work will be submitted according to the following schedule:

Item	Draft	Final or Completion Date
- Model development	-	June 1981
- Reevaluate four operating plans	-	July 1981
- Evaluate six new plans	-	September 1981
- Sensitivity analysis	-	October 1981
- Report	October 1981	November 1981

7. REVISIONS

The Contractor will incorporate suggestions or changes to working drawings, computations, and draft reports as determined necessary by the Contracting Officer at the various review points. Costs of these revisions will be included in the contract price.

REQUIRED COMPUTER PROGRAM STUDY FOR MISSISSIPPI RIVER HEADWATERS

1. STUDY OBJECTIVE

- a. Reevaluate four operating plans that were developed for the six Mississippi River Headwaters Lakes by the University of Minnesota's St. Anthony Falls Hydraulic Laboratory in 1979. The reevaluation will consist of rerunning the four operating plans using the new HEC-5 model with any modifications deemed necessary by the contractor.
- b. Evaluate six new operating plans for the six Mississippi River headwaters lakes as identified in paragraph 6 of this exhibit and as further detailed by the Government during the course of the contract.

2. NUMBER OF CONTROL POINTS

There are 11 control points. (This includes each of the six Mississippi River Headwaters Dams and five downstream locations shown on Exhibit 2. The five downstream locations are Libby, Aitkin, Royalton, Anoka, and St. Paul U.S.Geological Survey gages.).

3. PERIOD EVALUATED

1932 to 1976 inclusive.

4. NUMBER OF RESERVOIRS

The six headwaters lakes: Winnibigoshish, Leech, Pokegama, Sandy, Pine River, and Gull Lakes.

5. DURATION OF INTERVAL

Same as previous study by SAFHL. Normally 30 days except for high-flow periods when daily intervals are used.

Exhibit 1

- 6. NUMBER OF OPERATING PLANS (NUMBER OF RUNS)
- a. Reevaluation (four runs to include update of earlier version of present, low, high, and natural plans).
 - b. Evaluation of six new plans as follows:
- (1) A minimum guaranteed flow of 2,275 cfs at Anoka. In letters dated 2 May 1978, the Environmental Protection Agency and the Metropolitan Waste Control Commission have both requested evaluation of an alternative with flows of approximately this magnitude. This alternative would ensure 1,875 cfs at St. Paul after Twin City water withdrawals are made. This would be a combined water supply and water quality alternative for supplying year 2000 water needs identified by the June 1977 Minneapolis-St. Paul Level B Study.
- guaranteed flow of 4,800 cfs (2015) at Anoka. In a letter dated 23 May 1978, the Metropolitan Council requested the Corps of Engineers to evaluate a plan which would provide 4,000 cfs at St. Paul (in addition to Twin City water withdrawals). A 4,000-cfs guaranteed minimum low flow at St. Paul would require a delivered flow at Anoka of 4,200 cfs in 1970 and 4,800 cfs in 2015. The purpose of the guaranteed St. Paul low flow of 4,000 cfs would be to provide an assured water supply and water quality improvement in the Twin Cities area and to decrease the required level of sewage treatment (for example, 1983 water quality standards could possibly be maintained without tertiary treatment if the St. Paul 7-day 10-year low flow were equal to 4,000 cfs or 5,000 cfs).
 - (3) A plan that would optimize hydropower production.
 - (4) A plan that would minimize lake property damages.
 - (5) An environmental or conservation plan.
- (6) A plan that would allow a Sandy Lake drawdown to normal spring level and then gradually open Sandy Lake control gates to maintain the spring drawdown level. As the Mississippi River rises and Sandy Lake and the Mississippi

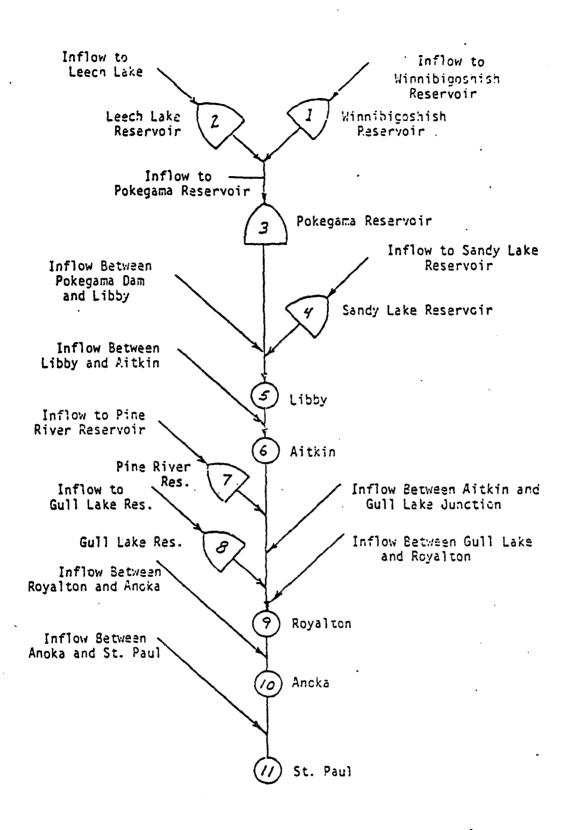
River are equalized, the control gates at Sandy Lake are left wide open to allow the Mississippi River and Sandy Lake to rise together.

Details of the above six plans will be supplied by the Government as required by the contractor.

7. STUDY PRODUCTS

In general, the study products will be similar to those generated in the earlier August 1979 study by the SAFHL with one major exception. The number of graphical plots will be less. Principal products will be as follows:

- a. Plots of both low- and high-stage frequency curves for each of the six headwaters reservoirs for the period 1932-1976 for each of the operating plans investigated. The curves should be developed for the recreation season 1 May to 30 September.
- b. Plots of high-flow frequency curves at Aitkin, Minnesota, and plots of low-flow frequency curves at the St. Paul gage for the period 1932-1976 for each of the plans investigated. The curves would be developed for the recreation season 1 May to 30 September.
- c. Summary comparison of average annual damages for each of the six headwaters lakes. Aitkin and St. Paul for the 10 operating plans in tabular form.
- d. Computer print-outs standard to the HEC-5 program, which are essential to the development of items a. through c. above.
- e. A summary report which would include, but not be limited to, the items in a. through d. above.
- f. Plots of 10 operating plans at the St. Paul gage, Aitkin, and at each of the six headwaters lakes for the period 1930 to 1976 are desirable. These plots are to be developed by computer in accordance with d. above.



Schematic Representation of Mississippi River Headwaters

Computer Model

SCOPE OF WORK MODIFICATIONS

The scope of work was modified during the course of the study to reflect changes in the schedule and the study's objectives, primarily as a result of the delays and problems caused by HEC-5 related errors.

A summary of these modifications follows: Date Modification 06-17-81 1. Change period of record for HEC-5 analysis to include 1930 and 1931. 2. Eliminate separate analysis of Plan 7 (Hydropower Plan), which is identical to Plan 6. 10-20-81 Change project completion date to 31 January 1982. 01-13-82 1. Change project schedule to: (a) submit draft report: 1 February 1982 (b) submit final report: 31 March 1982 (c) project completion date: 30 June 1982 04-09-82 1. Limit Plan 10 results to a discussion of procedures. No calculations will be made. 2. Limit future trips to St. Paul to June meeting to discuss report and project results and implementation of HEC-5 on St. Paul's Harris computer. No additional trips for further discus-

3. Change project schedule to:

funded separately.

- (a) submit draft report: 14 May 1982
- (b) submit final report: 18 June 1982

sions or public meetings will be required unless

APPENDIX B

MERGE PROGRAM DOCUMENTATION

APPENDIX B MERGE PROGRAM DOCUMENTATION

The Merge program takes monthly and daily data from HEC-DSS for select periods, compares the monthly and daily values, and replaces the monthly value with the largest daily value for the month if it is greater than the monthly value. This program has been used for this comparison and replacement of elevation data for the six reservoirs at the headwaters of the Mississippi River and high flow data at Aitkin, MN.

The documentation of the Merge program is presented in the following order:

- (1) merge-related files on the HEC Harris computer
- (2) input description
- (3) sample input sequence.

Merge files on the HEC Harris computer:

MERGE source code to access DSS and create new monthly file

MERGEX compilation of MERGE

MJCL1* JCL to execute MERGEX for Plan 1

MPLAN1* input sequence for Plan 1

MOUTI* output results for Plan 1

*Note: There is one set of JCL, input, and output for each plan studied.

INPUT DATA (10 Fields of 8 Columns Each)

A. TITLE CARDS

T1 Job & Run Title

T2

T3

B. JOB CARDS

J1 Card

Field Variable Value Description

1 NCP + Total number of Control Points (CP Cards) that require data merging

	2	NFLOOD	+	Total number of daily flood events that will be merged into monthly time series
	3	IPRINT	0 1	Full output Reduced output
C.	CONTROL	POINT CARDS		NCP sets required (J1.1)
	CP Card			
	Field	Variable V	alue	Description
	1	MCP (ICP)	+	Any integer id. no. (same as HEC-5 values) (must be less than 12) (ICP = 1, NCP)
	CR Card			
	1,2	CR(MM,4)	A	Basic parameter of the data (C part of pathname) ELEV or FLOW-REG
	ID Card			
	1,2	BR(MM,4)	A	Basic location identification of the data (B part of pathname) (use same as ID cards in HEC-5)
D.	HEC-DSS	CARDS		
	ZR Card			
	1,2	A(4)	A	"A" part of pathname for general grouping of data (corresponds to A part of pathname on HEC-5 run ZW card)
	3,4	F(4)	A	"F" part of pathname used for further qualification of data (corresponds to F part of pathname on HEC-5 run ZW card)
	ZW Card			
	1,2	AW(4)	Α	Same as ZR card
	3,4	FW(4)	A	Same as ZW card with additional letter "R" as last character of path-name part F
ε.	TIME SER	IES DATA CAR	DS	
	DM Card	(Monthly Tim	e Seri	es)
	1	Blank		
	2	SMON	A	military date of starting month in monthly time series
	3	EMON	A	military date of ending month in monthly time series

DD Card	(Daily Time	Series)	NFLOOD (CP.2) cards required
Field	Variable	<u>Value</u>	Description
1	NFLO	l to NFLOOD	Number of this daily flood event (sequential for each DD card)
2	SDAY(NFLD)	A	military date of starting day in monthly time series
3	EDAY(NFLD)	A	military date of ending day in monthly time series
EJ Card		end job	card.

MERGE Sample Input Sequence

```
HISSISSIPPI RIVER HEADWATERS STUDY - ST. PAUL DISTRICT ANCO JOB NO 3781 HERGE PROGRAM: COMPARISON OF MONTHLY AND DAILY VALUES IN DSS (01/27/82) PRESENT OPERATING PLAN - PLAN 1 7 20 0
HERGE PROGRITATION PRESENT OPEN TO PEN TO PE
                                                                      C= ELEV,
B= POKEGAMA RES.,
                                                              E ELEV,
B GULL RES.,
6
C = FLOW-REG,
B = AITKIN,
A = STPAUL, F = PLANI,
O 1 JAN1930 31DEC1976
1 01HAY1938 31HAY1938
2 01APR1941 31HAY1941
3 01JUN1944 31JUL1944
5 01HAR1945 31HAY1945
6 01APR1950 30JUN1950
8 01APR1952 31AUG1953
7 01APR1954 30JUN1954
11 01APR1954 30JUN1954
11 01APR1956 31HAY1956
12 01APR1967 31HAY1976
13 01APR1967 31HAY1976
15 01APR1967 31HAY1976
15 01APR1970 31HAY1976
16 01APR1970 31HAY1977
17 01APR1971 31HAY1971
18 01APR1972 31HAY1972
19 01APR1974 30JUN1974
20 01APR1975 31HAY1975
                         DD
DD
```

COST PROGRAM DOCUMENTATION

The Cost program takes monthly data from HEC-DSS, compares the monthly values with a minimum flow requirement, and calculated the cost of not meeting this requirement. This program has been used for this cost analysis of streamflow data at Anoka, MN.

The documentation of the Cost program is presented in the following order:

- (1) cost-related files on the HEC Harris computer
- (2) input description
- (3) sample input sequence.

Cost files on the HEC Harris computer:

COST source code to access DSS and calculate cost of failing to meet minimum flow requirements

COSTX compilation of COST

CJCL1* JCL to execute COSTX for Plan 1

CPLAN1* input sequence for Plan 1

COUT1* output results for Plan 1

*Note: There is one set of JCL, input, and output for each plan studied.

INPUT DATA (10 Fields of 8 Columns Each)

A. TITLE CARDS

Tl Job & Run Title

T2

T3

B. JOB CARDS

Jl Card

Field Variable Value Description

1 MFLOW + Minimum streamflow requirement at Anoka (cfs)

	2	COST	+	Cost of not meeting minimum flow requirement (\$/cfs-day)
c.	CONTROL	POINT CARDS		
	CR Card			
	1,2	C (4)	A	Basic parameter of the data (C part of pathname) FLOW-REG
	ID Card			
	1,2	B (4)	A	Basic location identification of the data (B part of pathname) (use same as ID cards in HEC-5)
D.	HEC-DSS	CARDS		
	ZR Card			
	1,2	A(4)	A	"A" part of pathname for general grouping of data (corresponds to A part of pathname on HEC-5 run ZW card)
	3,4	F(4)	A	"F" part of pathname used for further qualification of data (corresponds to F part of pathname on HEC-5 run ZW card)
E.	TIME SER	IES DATA CAR	DS	
	DM Card	(Monthly Tim	e Seri	es)
	1	Blank		

end job card.

2

3

EJ Card

SMON

EMON

military date of starting month in monthly time series

military date of ending month in monthly time series

```
TI MISSISSIPPI RIVER HEADWATERS STUDY - ST. PAUL DISTRICT ANCO JOB NO 3781
T2 COST PROGRAM: CALCULATION OF COST OF MIN FLOW AT ANOKA (04/12/82)
T3 PRESENT OPERATING PLAN - PLAN 1
J1 4800 385
CR C= FLOW-REG,
III B= ANOKA,
ZR A= STPAUL, F= PLAN1,
DM 01JAN1930 31DEC1976
```

C.

APPENDIX C

FATSO PROGRAM DOCUMENTATION

INPUT DESCRIPTION

FREQUENCY ANALYSIS OF TIME SERIES OBSERVATIONS (FATSO)

TT CARD - TITLE INFORMATION

ii omb	12166 4111	Online Lon	
FIELD	VARIABLE	VALUE	DESCRIPTION
1-10	ITIT	ALPHA	ALPHANUMERIC INFORMATION TO IDENTIFY THE JOB. AS MANY TT CARDS MAY BE PROVIDED AS NECESSARY TO INPUT THE DESIRED DESCRIPTIVE INFORMATION. THE FIRST THREE CARDS ARE STORED FOR SUBSEQUENT LABELS.
J1 CARD	- JOB SPECI	FICATIONS	(REQUIRED CARD)
FIELD	VARIABLE	VALUE	DESCRIPTION
1	JSTAT	+	STATISTICAL ANALYSIS OPTIONS. THE SUM OF THE FOLLOWING OPTIONS WILL GOVERN THE NUMBER AND KIND OF STATISTICAL ANALYSES THAT ARE PERFORMED ON THE DATA.
		1	ANALYTICAL FREQUENCY ANALYSIS.
		2	GRAPHICAL FREQUENCY ANALYSIS.
		4	DURATION ANALYSIS.
		8	MONTHLY MEANS OF DATA BY YEAR AND STATISTICS OF MONTHLY AND ANNUAL MEANS. STATISTICS INCLUDE MEAN, STANDARD DEVIATION, SKEW, MAXIMUM AND MINIMUM.
2	NPRDS	+	NOMINAL NUMBER OF PERIODS IN EACH EVENT, E.G., 365 IF DAILY DATA AND THE EVENT IS A YEAR, OR 12 IF MONTHLY DATA.
3	NYRS	+	NUMBER OF YEARS REPRESENTED BY THE EVENTS. HAY BE LEFT BLANK IF NYRS IS EQUAL TO THE NUMBER OF INPUT EVENTS.
4	JSTPD (1)	+	MONTH ORDER NUMBER OF FIRST PERIOD IN EACH EVENT, E.G. 1 FOR JAN, 10 FOR OCT, ETC. THIS VALUE IS USED TO SPECIFY THE WATER YEAR. IF BLANK, 1 IS ASSUMED.
5	JBEGN	÷	ORDER NUMBER OF FIRST PERIOD IN EACH EVENT TO SELECT FOR ANALYSIS. IF BLANK, PERIOD 1 IS ASSUMED. JBEGN AND JEND ARE USED TO SELECT A SPECIFIC SET OF SEQUENTIAL PERIODS FROM EACH EVENT.

	2400	/ AAUT 1	'A 44 11 11 A 4
.11	I:AKU	LLUNII	NUED)

JI CAKD	(COMITMOED)		
FIELD	VARIABLE	VALUE	DESCRIPTION
6	JEND	+	ORDER NUMBER OF LAST PERIOD IN TIME SERIES TO SELECT FOR ANALYSIS. IF BLANK, THE LAST PERIOD IS ASSUMED.
7	JPPF		PLOTTING POSITION FORMULA OPTION.
	(2)	. 1	WEIRULL PLOTTING POSITIONS.
		2	HEDIAN (BEARD) PLOTTING POSITIONS.
		3	HAZEN PLOTTING POSITIONS.
8	HONSS (0)		SUPPRESS SELECTED STATISTICS OF MONTHLY MEANS. SUM THE FOLLOWING DESIRED CODES:
		0	NO STATISTICS SUPPRESSION.
		1	SUPPRESS PRINTOUT OF THE MEAN.
		2	SUPPRESS PRINTOUT OF THE STANDARD DEVIATION.
		4	SUPPRESS PRINTOUT OF THE SKEW COEFFICIENT.
		8	SUPPRESS PRINTOUT OF THE MAXIMUMS.
		16	SUPPRESS PRINTOUT OF THE MINIMUMS.
8	LOGTH (0)		LOGARITHMIC TRANSFORMATION INDICATOR FOR STATISTICS OF THE MONTHLY MEANS.
		-1	USE SAME TRANSFORMATION AS LOGT (LS.3).
		0	NO TRANSFORMATION.
		i	LOG (BASE 10) TRANSFORMATION.
10	NDECM		NUMBER OF DECIMAL PLACES FOR TABLE OF MONTHLY MEANS.
		-1	USE SAME NUMBER AS NDEC (LS.4).
		+	0, 1, 2, OR 3 ALLOWED. IF LOGTM (J1.9) SPECIFIES A LOG TRANSFORM, THE MEAN, STANDARD DEVIATION, AND SKEW WILL BE PRINTED WITH 4 DECIMAL PLACES.

ID CARD -	LOCATION	IDENTIFICATION	(REQUIRED CARD)
-----------	----------	----------------	-----------------

FIELD	VARIABLE	VALUE	DESCRIPTION
1-10	ISTA	ALPHA	ALPHANUMERIC INFORMATION SUCH AS LOCATION IDENTIFICATION, STATION NUMBER, ETC. ALTHOUGH COLUMNS 3-80 MAY BE USED, ONLY COLUMNS 3-48 ARE PRINTED AS TABLE HEADINGS.
LS CARD	- LOCATION	SPECIFICAT	IONS (OPTIONAL CARD)
FIELD	VARIABLE	VALUE	DESCRIPTION
1	IANAL (0)		DATA SELECTION OPTION FOR FREQUENCY ANALYSIS SPECIFIED BY J1.1.
		0	ALL DATA IN EACH EVENT WILL BE ANALYZED.
		1	ANALYZE THE MAXIMUM VALUES SELECTED FROM EACH EVENT.
		2	ANALYZE THE MINIMUM VALUES SELECTED FROM EACH EVENT.
		3	ANALYZE BOTH MAXIMUM AND MINIMUM VALUES FROM EACH EVENT.
		4	ANALYZE ANNUAL VOLUME-DURATION DATA. (NOT PROGRAMMED YET)
2	NAME (FLOW, CFS)	ALPHA	VARIABLE NAME AND/OR UNITS TO BE USED FOR TABLE AND GRAPH HEADINGS.
3	LOGT (1)		LOGARITHMIC TRANSFORMATION INDICATOR FOR FREQUENCY ANALYSES.
		-1	NO TRANSFORMATION.
		0,1	LOG (BASE 10) TRANSFORM.
4	NDEC (0)	+	NUMBER OF DECIMAL PLACES TO PRINT IN TABLES OF PLOTTING POSITIONS AND FREQUENCY CURVE ORDINATES - 0, 1, 2, OR 3 ALLOWED.
5	NSIG (3)		NUMBER OF SIGNIFICANT FIGURES IN PRINTOUT OF COMPUTED FREQUENCY CURVE ORDINATES.
		-1	NO ROUNDING WILL BE DONE.
		0	DEFAULT OF THREE SIGNIFICANT FIGURES.

ROUND VALUES TO NSIG SIGNIFICANT FIGURES.

LS CARD (CONTINUED)

FIELD	VARIABLE	VALUE	DESCRIPTION
6	IPRNT (0)	+	THE SUM OF THE FOLLOWING PRINTOUT SUPPRESSION OPTIONS WILL CONTROL THE AMOUNT OF OUTPUT AND DIAGNOSTIC INFORMATION.
		0	STANDARD OUTPUT WILL NOT BE SUPRESSED AND NO DIAGNOSTIC INFORMATION WILL BE OUTPUT.
		1	SUPPRESS LISTING OF THE INPUT TIME SERIES DATA.
		2	SUPPRESS PRINTOUT OF PLOTTING POSITION TABLE.
		4	SUPPRESS PRINTOUT OF FREQUENCY CURVE ORDINATES.
		8	SUPPRESS PRINTOUT OF FREQUENCY STATISTICS.
		16	SUPPRESS FREQUENCY CURVE PRINTER PLOT.
		128	PROVIDE DIAGNOSTIC OUTPUT AT VARIOUS STEPS OF INTERPOLATION FOR FREQUENCY CURVE ORDINATES.

FR CARD - INPUT EXCEEDANCE FREQUENCIES (OPTIONAL CARD)

THIS OPTIONAL CARD SPECIFIES PERCENT CHANCE EXCEEDANCE (EXCEEDANCE FREQUENCY) VALUES OTHER THAN THE FOLLOWING 12 DEFAULT VALUES OF - 0.2, 0.5, 1, 2, 5, 10, 20, 50, 80, 90, 95, AND 99.

FIELD	VARIABLE	VALUE	DESCRIPTION
1			NOT USED
2	NFRQ (12)	+	NUMBER OF PERCENT CHANCE EXCEEDANCE VALUES FOR WHICH TO COMPUTE FREQUENCY CURVE ORDINATES. DIMENSIONED FOR A MAXIMUM OF 18 VALUES.
3-10	FREQ (SEE ABOVE)	+	PERCENT CHANCE EXCEEDANCE VALUES. IF THERE ARE MORE THAN 8 VALUES, THE 9TH VALUE MUST BE IN THE FIRST FIELD OF THE SECOND FR CARD.

SC CARD - SPECIFIED COORDINATES (OPTIONAL CARD)

FIELD	VARIABLE	VALUE	DESCRIPTION
1	NSCV (0)	+	NUMBER OF PAIRS OF SPECIFIED COORDINATES. DIMENSIONED FOR 4.
2	XSC	+	PERCENT CHANCE EXCEEDANCE FOR THE FIRST COORDINATE.
3	YSC	+	CORRESPONDING VALUE OF THE RESPONSE VARIABLE, FOR EXAMPLE FLOW, STAGE, ETC.
4-9	XSC,YSC	+	REMAINING PAIRS OF DATA.
10			NOT USED.

CL CARD - CLASS LIMITS FOR DURATION ANALYSIS (OPTIONAL CARD)

THIS CARD SPECIFIES THE NUMBER OF CLASSES AND THE LOWER LIMIT FOR EACH CLASS. DEFAULT VALUES ARE NOT YET AVAILABLE.

FIELD	VARIABLE	VALUE	DESCRIPTION
1	NCLV	+	NUMBER OF CLASS LIMIT VALUES. DIMENSIONED FOR 59.
2	CLV	+	THE LOWEST VALUE (CLASS LIMIT) TO BE INCLUDED IN CLASS 1. SMALLER VALUES WILL BE ASSIGNED TO CLASS ZERO (0).
3-10	CLV	+	REPEAT AS REQUIRED BY NCLV. IF THERE ARE MORE THAN 9 VALUES, THE 10TH VALUE WILL BEGIN IN THE FIRST FIELD OF THE NEXT CARD.

RV CARD - REVISION OF INPUT DATA (OPTIONAL CARD)

THIS CARD IS USED TO MODIFY A SET OF DATA BY THE ADDITION OR MULTIPLICATION OF THE SPECIFIED CONSTANT.

FIELD	VARIABLE	VALUE	DESCRIPTION
1	IFUNC		MATHEMATICAL OPERATION TO PERFORM ON DATA.
		1	ADD THE QUANTITY CONST (RV.2) TO EACH DATA VALUE.
		2	MULTIPLY THE QUANTITY CONST (RV.2) BY EACH DATA VALUE.
2	CONST	+	THE VALUE WHICH WILL BE USED IN THE OPERATIONS SPECIFIED BY IFUNC (RV.1).

ZR CARD - DSS READ PATHNAME (OPTIONAL CARD)

THIS CARD SPECIFIES THE PATHNAME OF DATA TO BE ACQUIRED FROM THE DATA STORAGE SYSTEM (DSS). THE PROGRAM WILL CREATE "IN" CARDS TO BE PROCESSED BY THE ANALYSIS PORTION OF THE PROGRAM.

FIELD VARIABLE VALUE

DESCRIPTION

1-10 (PATHNAME) ALPHA

ALPHANUMERIC PATHNAME OF FILE AS GENERATED BY HEC DSS. USE THE FOLLOWING FORMAT BEGINNING IN COLUMN 2:

A=PROJECT B=LOCATION C=PARAMETER, ETC.

WHEN SUCCESSIVE ANALYSES ARE MADE, ONLY THE PATHNAME PARTS THAT CHANGE NEED TO BE PROVIDED.

ZT CARD -- DSS TIME AND DATES (OPTIONAL CARD)

THIS CARD IS USED TO SPECIFY THE STARTING AND ENDING TIMES AND DATES FOR THE DATA TO BE ACQUIRED FROM DSS. THIS CARD MUST BE PROVIDED AFTER THE FIRST ZR CARD ONLY AND ALL TIMES AND DATES REMAIN FIXED UNTIL A EJ CARD IS ENCOUNTERED.

FIELD	VARIABLE	VALUE	DESCRIPTION
1	ITIHST	+	STARTING TIME IN HOURS AND MINUTES IN 24-HOUR TIME, E.G. 1305 FOR 5 MINUTES AFTER 1 PM. USE ZERD (0) FOR DAILY, HONTHLY, OR ANNUAL DATA.
2-3	IDATST	ALPHA	STARTING DATE FOR ANALYSIS IN MILITARY STYLE, E.G. 01JAN1933. LOCATE WITHIN COLUMNS 13 TO 24.
4	ITIMEN	+	ENDING TIME IN MINUTES (24-HOUR TIME).
5-6	IDATEN	ALPHA	ENDING DATE FOR ANLYSIS IN MILITARY STYLE. LOCATE WITHIN COLUMNS 37-48.

ZW CARD - DSS WRITE PATHNAME (OPTIONAL CARD) (WILL BE FORMATTED LATER)

BF CARD - BEFORE DATA (OPTIONAL CARD)

THIS CARD IS USED TO SPECIFY INPUT DATA FORMATS (OTHER THAN THE DEFAULT) AND VARIABLE NUMBER OF PERIODS IN EACH EVENT.

FIELD	VARIABLE	VALUE	DESCRIPTION
1	IFHT (1)	0	NOT PROGRAMMED YET
		1	BATA WILL BE INPUT WITH 12 VALUES ON EACH CARD (USEFUL FOR MONTHLY DATA). COLS 3-6 ARE FOR AN OPTIONAL INTEGER LOCATION NUMBER, COLS 7-8 ARE FOR THE LAST TWO DIGITS OF THE YEAR, AND COLS 9-80 ARE FOR 12 DATA VALUES IN EACH 6 COLUMN FIELD.
		2	DATA WILL BE INPUT WITH THE FIRST "IN" CARD CONTAINING AN INTEGER LOCATION NUMBER IN COLS 3-8 AND THE STARTING YEAR IN COLS 13-16. THE DATA WILL FOLLOW ON SUCCESSIVE "IN" CARDS IN 10 FIELDS OF 8 COLS EACH.
		3	THIS FORMAT IS GENERATED BY THE PROGRAM WHEN THE DATA READ FROM DSS ARE MONTHLY VALUES.
		4	THIS FORMAT IS GENERATED BY THE PROGRAM WHEN THE DATA READ FROM DSS ARE DAILY VALUES.
2	NPRDS	ŧ	ACTUAL NUMBER OF PERIODS FOR AN EVENT ON FOLLOWING "IN" CARDS UNTIL NEXT ID, BF, OR EJ CARD.

IN CARD - TIME SERIES DATA (REQUIRED CARD EXCEPT WHEN DATA COMES FROM DSS)

THESE CARDS ARE USED TO INPUT THE TIME SERIES INFORMATION. IF THE DATA ARE INPUT VIA DSS, THESE CARD IMAGES WILL BE GENERATED BY THE PROGRAM.

(NOTE - FOR FORMAT, SEE BF CARD DESCRIPTION)

EJ CARD - END OF JOB INDICATOR (REQUIRED BETWEEN JOBS)

BF CARD - BEFORE DATA (OPTIONAL CARD)

THIS CARD IS USED TO SPECIFY INPUT DATA FORMATS (OTHER THAN THE DEFAULT) AND VARIABLE NUMBER OF PERIODS IN EACH EVENT.

FIELD	VARIABLE	VALUE	DESCRIPTION
1	IFHT	0	NOT PROGRAMMED YET
	(1)	1 .	DATA WILL BE INPUT WITH 12 VALUES ON EACH CARD (USEFUL FOR MONTHLY DATA). COLS 3-6 ARE FOR AN OPTIONAL INTEGER LOCATION NUMBER, COLS 7-8 ARE FOR THE LAST TWO DIGITS OF THE YEAR, AND COLS 9-80 ARE FOR 12 DATA VALUES IN EACH 6 COLUMN FIELD.
		2	DATA WILL BE INPUT WITH THE FIRST 'IN' CARD CONTAINING AN INTEGER LOCATION NUMBER IN COLS 3-8 AND THE STARTING YEAR IN COLS 13-16. THE DATA WILL FOLLOW ON SUCCESSIVE 'IN' CARDS IN 10 FIELDS OF 8 COLS EACH.
		3	THIS FORMAT IS GENERATED BY THE PROGRAM WHEN THE DATA READ FROM DSS ARE MONTHLY VALUES.
		4	THIS FORMAT IS GENERATED BY THE PROGRAM WHEN THE DATA READ FROM DSS ARE DAILY VALUES.
2	NFRDS	+	ACTUAL NUMBER OF PERIODS FOR AN EVENT ON FOLLOWING "IN" CARDS UNTIL NEXT ID, BF, OR EJ CARD.

IN CARD - TIME SERIES DATA (REQUIRED CARD EXCEPT WHEN DATA COMES FROM DSS)

THESE CARDS ARE USED TO INPUT THE TIME SERIES INFORMATION. IF THE DATA ARE INPUT VIA DSS, THESE CARD IMAGES WILL BE GENERATED BY THE PROGRAM.

(NOTE - FOR FORMAT, SEE BF CARD DESCRIPTION)

EJ CARD - END OF JOB INDICATOR (REQUIRED BETWEEN JOBS)

APPENDIX D

HEC-DSS PROGRAM DOCUMENTATION

HECDSS

HYDROLOGIC ENGINEERING CENTER DATA STORAGE SYSTEM PREPARED BY

MARK LEWIS

TYPIST

SHIRLEY SPARKS

THIS PROGRAM AND DOCUMENTATION IS AVAILABLE THROUGH THE COMPUTER SUPPORT BRANCH:

HYDROLOGIC ENGINEERING CENTER 609 SECOND STREET DAVIS, CALIFORNIA 95616 PHONE (916) 440-3285 OR FTS 448-3285.

INTRODUCTION

THIS MANUAL GIVES A DESCRIPTION OF THOSE UTILITIES FOR CREATING AND ACCESSING A DATA BASE SYSTEM WHICH IS WRITTEN IN TRANSPORTABLE FORTRAN. THE DATA STORAGE SYSTEM WAS DEVELOPED AS A STANDARD INTERMEDIARY STORAGE FORMAT BETWEEN VARIOUS WATER RESOURCES MODELING PROGRAMS, BUT IT IS DESIGNED FOR MORE GENERAL APPLICABILITY. THE SYSTEM IS HIERARCHIAL AND UTILIZES PATHNAME STRINGS AS DIRECTORY

THE MANUAL IS DIVIDED INTO FOUR SECTIONS:

- OVERVIEW DSS SYSTEM CALLS INTERNAL DETAILS OTHER AVAILABLE SOFTWARE TOOLS

THE OVERVIEW PROVIDES AN INTRODUCTION TO DSS, THE PHILOSOPHY AND CONVENTIONS, AND ASPECTS PERTAINING TO PORTABILITY OF THE SYSTEM.

THE SYSTEM CALLS ARE USUALLY INVOKED DIRECTLY FROM AN APPLICATION PROGRAM, AND ARE DESCRIBED FOR THE APPLICATION PROGRAMMER TO HELP INTERFACE HIS PARTICULAR PROGRAM TO DSS FILES.

THE INTERNAL DETAILS ARE CONCERNED WITH IMPLEMENTING AND SUPPORTING HECDSS ON A PARTICULAR COMPUTER. IT DISCUSSES THE WORKINGS OF PRIMITIVE SUBROUTINES NOT CALLED DIRECTLY BY THE APPLICATION PROGRAMS.

THE OTHER SOFTWARE TOOLS ARE A SET OF SYSTEM INDEPENDENT PRIMITIVES USEFUL FOR A WIDE VARIETY OF PROGRAMMING APPLICATIONS, ESPECIALLY INVOLVING STRINGS MANIPULATIONS. THE DSS SYSTEM MAKES USE OF THESE PRIMITIVES, AND THEY ARE AVAILABLE TO THE APPLICATION PROGRAMMER AS WELL.

OVERVIEW

ONE OF THE MANY PROBLEMS WHICH PROGRAMMERS AND USERS FACE IS THE LACK OF A STANDARD FILE SYSTEM FROM MACHINE TO MACHINE. MANY ENCHANCED VERSIONS OF FORTRAN CONTAIN VARIOUS PROGRAMMING CONSTRUCTS FOR USING RANDOM ACCESS FILES. THE CHARACTERISTICS OF EACH SYSTEM MAY VARY CONSIDERABLY, AND THE ABILITY TO USE VARIABLE LENGTH RANDOM ACCESS RECORDS IS NOT VERY COMMON.

THE TWO MOST COMMON LANGUAGE CONSTRUCTS USED FOR RANDOM INPUT/OUTPUT ARE THE SUBROUTINE CALL AND THE EXTENDED READ/WRITE STATEMENTS. THE SUBROUTINE CALL IS THE METHOD OF CHOICE FOR DSS BECAUSE IT IS SYNTACTICALLY CORRECT IN ALL FORTRAN.

OFTEN A PROGRAMMER IS GIVEN AN ASSIGNMENT WHICH REQUIRES STRUCTURING A DATA BASE, AND THEY ARE CAUGHT IN A DILEMMA OF MAINTAINING FLEXIBILITY AND PORTABILITY WHILE WORKING WITHIN THE CONSTRAINTS OF INSTALLATION SPECIFIC CONVENTIONS. HECDSS WAS IMPLEMENTED IN SUCH A WAY SO THAT NON-STANDARD REQUIREMENTS ARE MINIMIZED AND ISOLATED IN TERMS OF WIDELY SUPPORTED SERVICES, AVAILABLE ON ALL MODERN COMPUTERS. THIS PERMITS THE SYSTEM TO BE IMPLEMENTED WITH VERY LITTLE TROUBLE, WHILE PROVIDING A SOPHISTICATED HIERARCHICAL DATA BASE FACILITY.

A RATIONAL NAMING SYSTEM FOR ACCESS INTO THE DATA BASE WILL HELP TO KEEP THE USERS AWARE OF WHAT INFORMATION IS STORED, AND CONFIDENT THAT THE INFORMATION IS RETRIEVABLE. DSS USES ARBITRARY LENGTH CHARACTER STRINGS FOR RECORD NAMES, WHICH ARE CHOSEN BY THE USER. SINCE THE SYSTEM HAS A HIERARCHICAL DIRECTORY STRUCTURE, IT IS ADVANTAGEOUS TO BOTH THE USER AND DSS FOR THE NAMES TO BE PATHNAMES, THAT IS, CONCATENATED SUBSTRINGS DELIMITED BY A SPECIAL SEPARATOR CHARACTER (USUALLY A SLASH, /). WITH THIS METHOD, THE USER CAN ORGANIZE HIS RECORDS BY GROUPING SUBNAMES, INCREASINGLY SPECIFIC TO THE RIGHT. FOR EXAMPLE,

/JOE USER/PROJECTA/STEP 2/DATATYPE III/
/JOE USER/PROJECTA/STEP 4/DATATYPE V/

DSS PROVIDES A SIMPLE PATHNAME FORMING SUBROUTINE, ZFPN, WHICH PROVIDES THE DELIMITER AND CONCATENATES THE NAME PARTS. ALL CHARACTER STRING MANIPULATION TRANSPARENTLY UTILIZES LOCAL MACHINE WORD SIZE.

HECDSS IS CAPABLE OF MAINTAINING SEVERAL OPEN FILES
CONCURRENTLY. ONE OF THE DESIGN DECISIONS WAS THAT USER PROGRAMS
SHOULD NOT BE PENALIZED FOR SPACE IF THEY DID NOT USE MULTIPLE FILES,
THEREFORE, A USER PROGRAM LOCAL HOST ARRAY IS USED FOR MAINTAINING A
FILE TABLE FOR EACH FILE. THE DONATED AREA, DIMENSIONED WITHIN THE
PROGRAM WHICH CALLS THE DSS, MUST NOT BE USED WHILE THE CORRESPONDING
FILE IS OPEN. IT TYPICALLY USES ABOUT 1200 MACHINE WORDS FOR EACH
CONCURRENT FILE. USING THIS METHOD, IT IS POSSIBLE TO MANIPULATE AN
PAGE 3

ARBITRARY NUMBER OF FILES FOR SUCH TASKS AS MERGING AND COPYING. THIS HOST ARRAY IS NAMED IFLIAB IN THE SUBROUTINE DESCRIPTIONS BELOW.

THREE ITEMS MAKE UP A DSS RECORD. EVERY RECORD HAS A USER SUPPLIED NAME, WHICH IS A CHARACTER STRING ARRAY WITH A KNOWN NUMBER OF CHARACTERS. RECORDS MAY OPTIONALLY HAVE A DATA LIST AND A HEAD LIST. THE DATA IS AN ARRAY OF THE INFORMATION, TYPICALLY A LIST OF NUMBERS, WHICH THE USER WANTS TO SAVE. HEAD IS AN ADDITIONAL ARRAY WHICH CONTAINS AS MUCH ASSOCIATED INFORMATION AS NEEDED BY THE USER, TYPICALLY DIMENSIONS OR DATA UNITS AND TYPES.

IF DSS FILES ARE TO BE SAVED BETWEEN PROGRAM RUNS, THE LOCAL JOB CONTROL LANGUAGE AND STORAGE MEDIUMS MUST BE USED. HOWEVER, ON SOME SYSTEMS, IT MAY BE POSSIBLE TO IMPLEMENT AUTOMATIC FILE RETRIEVAL AND SAVING SERVICES, WHICH WOULD BE ENTIRELY IN LINE WITH THE PHILOSOPHY BEHIND DSS, TO MAKE RECORD MANAGING AS UNIFORM AND EASY AS POSSIBLE FOR ITS USERS.

IF A PRE-EXISTING DSS FILE IS ATTACHED TO A PROGRAM EXECUTION, IT WILL BE RECOGNIZED WHEN IT IS REFERENCED THROUGH THE SYSTEM CALLS BELOW. IF NO FILE IS ATTACHED, ONE WILL BE CREATED. BY DEFAULT, INTERNAL LOGICAL UNIT NUMBERS, BEGINNING WITH UNIT 71, 72, ... ARE ASSIGNED TO EACH FILE. THIS MAY BE OVERRIDDEN BY A SYSTEM CALL TO USE ANY LOCALLY LEGAL NAME.

******** PREFACE TO VERSION 4:0 **********************

VERSION 4:0 DIFFERS FROM THE PREVIOUS VERSION IN THREE WAYS:

- AN INTERNAL BLOCKING SCHEME WAS ADDED TO SIGNIFICANTLY REDUCE FILE STORAGE SPACE.
 THE NEED FOR THE RECORD TABLE WAS ELIMINATED.
- THE ABILITY TO DELETE WAS ADDED, PERMITTING OTHER UTILITIES.

TO USE PROGRAMS DVELOPED UNDER THE OLD VERSION, THE FOLLOWING BASIC CHANGES SHOULD OR MAY BE USED.

1) INCREASE THE SIZE OF THE FILE TABLE (IFLTAB) ACCORDING TO THE GUIDELINES ON PAGE 6.

2) ELIMINATE THE RECORD TABLE (IRCTAB) AS AN ARGUMENT.

- ALL REFERENCES MAY BE ELIMINATED.
 NHEAD AND NDATA MUST BE SPECIFIED IN MACHINE WORDS.
 THE RECORD LENGTH NEED NOT BE SET BY ZRECL, EVEN
 FOR LARGE RECORDS. IT REMAINS AS AN OPTION.

DSS SYSTEM CALLS

THE SET OF SUBROUTINE CALLS WHICH MAY BE USED BY THE APPLICATION PROGRAM TO INTERACT WITH THE DSS ARE DESCRIBED BELOW. THEY INCLUDE UTILITIES FOR WRITING, READING, CHECKING, MAKING INVENTORIES, AS WELL AS SOME OTHERS. UTILITIES WILL BE ADDED IN THE FUTURE TO DO SUCH TASKS AS EDITING, PLOTTING, STATISTICS, RENAMING, MULTIPLE NAMING, AND DELETING RECORDS.

THE FOLLWING LIST SHOWS THE PARAMETER NAMES IN THE CORRECT CALLING SEQUENCE, WITH ARRAYS INDICATED BY AN EMPTY SET OF PARAMTHESES. NOTICE THAT THERE ARE MANY PARAMETERS WHICH ARE THE SAME IN SEVERAL CALLS. ALL SUBROUTINE NAMES IN THE DSS PACKAGE, AS WELL AS ITS INTERNAL COMMON BLOCKS, BEGIN WITH THE LETTER Z.

THE FOLLOWING SCENARIO WILL ILLUSTRATE THE USE OF THE SYSTEM CALLS:

A WATER RESOURCES SIMULATION PROGRAM WILL BE READING SOME PREVIOUSLY SAVED INFORMATION FROM A DSS FILE, DO SOME COMPUTING, AND SAVE SOME MORE RESULTS IN THE SAME FILE. THE LISTING OF NAMES ON THE FILE WILL BE PRINTED, AND THE FILE CLOSED SO THAT IT CAN BE SAVED ON SOME PERMANENT STORAGE DEVICES, SUCH AS MAGNETIC TAPE.

THE SIMULATION PROGRAM IS WELL DESIGNED, AND ALL INPUT IS LOCALIZED IN A SPECIFIC SUBROUTINE. AT SOME POINT IN THE INPUT SECTION, THERE ARE CALLS TO DSS. CALL ZFNAME DEFINES THE NAME OF THE FILE TO BE ACCESSED. ZFPN CAUSES A PATHNAME TO BE FORMED, CONSISTENT TO SOME RATIONAL ORGANIZATION OF NAMES AGREED UPON FOR THIS APPLICATION. ZCHECK IS CALLED TO SEE WHETHER SOME NAMED RECORD EXISTS, AND ZREAD TO RETREIVE THAT INFORMATION. IN ANOTHER OUTPUT SUBROUTINE, A CALL ZSET CAUSES ALL FUTURE WRITES TO BE LABELLED WITH THE IDENTIFICATION OF THE CALLING PROGRAM. CALLS TO ZWRITE CAUSE INFORMATION TO BE SAVED FOR OTHER PROGRAMS TO USE LATER. CALLS TO ZDLETE CAUSE THE NAMED RECORDS TO BE DELETED. FINALLY, BEFORE THE END OF THE PROGRAM, A CALL IS MADE TO ZLIST FOR AN INVENTORY OF RECORD NAMES, AND A CALL TO ZCLOSE TO CAUSE THE FINAL FILE TRANSFERS.

THE COMMON PARAMETER NAMES WILL EXPLAINED HERE FIRST, AND ONLY BRIEFLY IN EACH SEPARATE LISTING BELOW.

IFLTAB - INTEGER ARRAY. DIMENSIONING DEPENDS ON THE RECORD LENGTH OF THE DSSFILE. USING THE DEFAULT VALUE, IFLTAB SHOULD BE ABOUT 1200 MACHINE WORDS LONG. OTHERWISE, THE LENGTH IS ABOUT:

LENGTH OF IFLTAB = RECORD LENGTH + 300 (MACHINE WORDS)

FILE TABLE IS USED BY DSS FOR INFORMATION CONCERNING THE ASSOCIATED FILE. USE A SEPARATE IFLTAB FOR EACH CURRENTLY OPENED FILE, AND DO NOT CHANGE ANY PART OF IFLTAB AS LONG AS THE FILE IS OPEN.

- KNAME CHARACTER STRING ARRAY. DIMENSION LONG ENOUGH TO HOLD THE NUMBER OF CHARACTERS IN YOUR RECORD NAMES. KNAME IS TYPICALLY A PATHNAME WITH SLASH DELIMITERS CONSTRUCTED BY SYSTEM CALL ZFPN.
- NNAMCR SIMPLE INTEGER. CONTAINS THE LENGTH OF THE KNAME IN NUMBER OF CHARACTERS.
- HEAD ARRAY, INTEGER OR REAL. DIMENSION LONG ENOUGH TO HOLD THE AUXILIARY INFORMATION SAVED ALONG WITH THE DATA FOR A PARTICULAR RECORD.
- NHEAD SIMPLE INTEGER. CONTAINS THE NUMBER OF HEAD WORDS TO USE FOR THE NAMED RECORD.
- DATA ARRAY, INTEGER OR REAL. DIMENSION LONG ENOUGH TO HOLD THE INFORMATION TO SAVE FOR THE RECORD.
- NDATA SIMPLE INTEGER. CONTAINS THE NUMBER OF DATA WORDS TO USE FOR THE NAMED RECORD.
- IPLAN SIMPLE INTEGER. PLAN OF ACTION CODE FOR SYSTEM CALLS ZWRITE AND ZREAD WHICH WILL HELP IN CERTAIN CHOICES DURING THOSE SUBROUTINES.
- LFOUND LOGICAL SIMPLE VARIABLE. WILL RETURN WITH A VALUE OF .TRUE. IF THE NAMED RECORD WAS ALREADY IN THE DSS FILE. FALSE. OTHERWISE.

ZSET - SET A DSS FLAG OR PARAMETER.

CALL SEQUENCE

CALL ZSET(IFLAG, IVAL)

PARAMETERS

IFLAG - FOUR CHARACTER HOLLERITH SPECIFIER OF DSS FLAG OR VARIABLE WHICH IS TO BE CHANGED OR SET.

IVAL - VALUE WITH WHICH TO SET VARIABLE OR FLAG.

DESCRIPTION

A. STORING PROGRAM NAME IN DATA RECORDS.

ALLOWS THE PROGRAMMER TO STORE A HOLLERITH MNEMONIC NAME FOR THE CALLING PROGRAM IN EACH RECORD.

IFLAG - CONTAINS THE SPECIFIER "4HPRGN"

IVAL - CONTAINS THE FOUR CHARACTER PROGRAM NAME.
THE DEFAULT IS 4HNONE.

FOR EXAMPLE: CALL ZSET(4HPRGN,4HLOAD) RECORDS WRITTEN AFTER THIS CALL WILL CARRY THE IDENTIFIER "LOAD".

B. FILE PROTECTION AGAINST DISK CRASHES AND PROGRAM ABORTION.

NORMALLY, IF A FILE IS BEING CREATED OR CHANGED WHEN INTERRUPTED, THE FILE IS DAMAGED BEYOND RECOVERY. TO HELP PROTECT A FILE AGAINST THIS, THE SAFE FLAG MAY BE SET. IT SHOULD NOT BE SET IF THE FILE IS NOT BEING CHANGED, OR IF THE ORIGINAL FILE IS NOT EASILY REGENERATED OR RECOVERED.

IFLAG - CONTAINS THE SPECIFIER "4HSAFE".

IVAL - CONTAINS THE INSTRUCTION "2HON" OR "3HOFF". THE DEFAULT VALUE IS "3HOFF".

EXAMPLE: CALL ZSET(4HSAFE,2HON) SETS THE SAFE MODE.

C. FORCING ZREAD OUTPUT MESSAGE.

NORMALLY, ZREAD DOES NOT ISSUE A MESSAGE WHEN A RECORD IS FOUND. SETTING THIS FLAG FORCES A MESSAGE TO THE OUTPUT.

IFLAG - CONTAINS THE SPECIFIER "4HPTPN" (PRINT PATHNAME)

IVAL - CONTAINS THE INSTRUCTION "2HON" OR "3HOFF". THE DEFAULT IS 3HOFF.

EXAMPLE: CALL ZSET(4HPTFN, 2HON) FORCES A ZREAD MESSAGE.

DIAGNOSTICS

BUGS

ZOPEN - OPENS A DSS FILE AND INITIALIZES.

CALL SEQUENCE

CALL ZOPEN(IFLTAB())

PARAMETERS

IFLTAB - DESCRIBED ABOVE

DESCRIPTION

OPENS FILE AND INITIALIZES THE DSS ROUTINES. A SEPARATE CALL MUST BE MADE FOR EACH FILE. ZOPEN RECOGNIZES WHETHER OR NOT A FILE HAS BEEN PREVIOUSLY OPENED. AS OF NOW, THIS MUST BE CALLED EXPLICITLY BEFORE READING, WRITING, DELETING, LISTING, OR CHECKING.

DIAGNOSTICS

ZFPN - FORM A PATHNAME FROM SUBSTRINGS

CALL SEQUENCE

CALL ZFPN(IA(), NA, IB(), NB, IC(), NC, ID(), ND, IE(), NE, IF(), NF, KNAME(), NNAMCR)

PARAMETERS

IA, IB, IC, IB, IE, IF - CHARACTER STRING ARRAYS, WHICH WILL BE CONCATENATED INTO THE RESULTING STRING NAME KNAME, IN THE ORDER SUPPLIED.

NA,NB,NC,ND,NE,NF - THE ASSOCIATED STRING LENGTHS IN TERMS OF THE CHARACTER COUNT INTEGERS

KNAME, NNAMOR - CONTAINING THE RESULTS, AS DESCRIBED ABOVE.

DESCRIPTION

FORM A SIX-PART PATHNAME BY USING THE SUPPLIED CHARACTER STRINGS, INSERTING A DELIMITING SLASH CHARACTER BEFORE EACH PART, AND AT THE END. NULL PATH PARTS ARE INDIC TO BY PASSING IN A ZERO COUNT FOR THE PARTICULAR SUBSTRING.

DIAGNOSTICS

BUGS

ZUFPN - UN-FORM A PATHNAME INTO SUBSTRINGS

CALL SEQUENCE

CALL ZUFPN(IA(), NA, IB(), NB, IC(), NC, ID(), ND, IE(), NE, IF(), NF, KNAME(), NNAMCR, ISTAT)

PARAMETERS

IA, IB, IC, ID, IE, IF - CHARACTER STRING ARRAYS, WHICH WILL BE CONCATENATED INTO THE RESULTING STRING NAME KNAME, IN FILLED WITH THE PATHNAME PARTS FROM KNAME, THE ORDER SUPPLIED, WHERE THE PATHNAME IS /A/B/C/D/E/F/.

NA, NB, NC, ND, NE, NF - THE ASSOCIATED STRING LENGTHS OF EACH PATHNAME PART.

KNAME - THE PATHNAME TO BE UN-FORMED.

NNAMCR - MAXIMUM LENGTH OF PATHNAME (CHARACTERS)

(DOES NOT HAVE TO BE ACTUAL LENGTH)

ISTAT - STATUS PARAMETER. RETURNED ZERO IF OPERATION OCCURED PROPERLY. ISTAT = 50, IF TOO MANY PARTS (MUST HAVE 7 / 'S).

DESCRIPTION

UN-FORMS A SIX PART PATHNAME, WHOSE PARTS ARE SEPERATED BY A SLASH. PLACES EACH PART INTO THE CORRESPONDING CHAARACTER STRING. THE LENGTH OF EACH STRING IS RETURNED IN THE ADJCENT INTEGER (EG. NA, NB)

DIAGNOSTICS

ISTAT = 50 *ILLEGAL PATHNAME, NOT SEVEN SLASHES.

ZGPNP - GET PATH NAME PARTS FROM A CARD IMAGE

CALL SEQUENCE

CALL ZGPNP(ICARD, A, B, C, B, E, F, ISTATS)

PARAMETERS

ICARD - ARRAY CONTAINING THE CARD IMAGE TO BE PROCESSED

A,B,C,D,E,F - ARRAYS RETURNING THOSE PARTS FOUND (SAME AS IA, IB, ETC.)

ISTATS - ARRAY USER DIMENSIONS TO 6. DESCRIBES INFORMATION ABOUT EACH PART.
ISTATS(1) DESCRIBES PART A
ISTATS(2) DESCRIBES PART B, ETC.
ISTATS() RETURNS THE STRING LENGTH OF THE PART FOUND
ISTATS() RETURNS -1 IF THAT PART WAS NOT FOUND

USER MAY SPECIFY NOT TO LOOK FOR A PART BY SPECIFYING ISTATS() = -2, BEFORE CALLING ZGPNP

USER MAY SPECIFY THE MAXIMUM NUMBER OF CHARACTERS TO READ FOR A PART, BY SETTING ISTATS() = -(MAX), REFORE CALLING (ISTATS = NEGATIVE MAXIMUM LENGTH).

DESCRIPTION

SEARCHES THE EIGHTY CARD IMAGE FOR EQUAL SIGNS PRECEEDED BY THE PART
NAME (EG. A,B,C,D,E,F) - L (LOCATION) AND P (PARAMETER) ARE ALSO VALID, WHERE
THE L PART IS PUT INTO B, AND P INTO C. PUTS THE PART FOLLOWING THE EQUAL INTO THE
CORRESPONDING ARRAY, AFTER REMOVING LEADING BLANKS. REPORTS THE LENGTH
OF THE PART IN ISTATS(). THE FIELD IS ENDED BY EITHER A COMMA, A SUBSEQUENT
EQUAL SIGN (LESS THE PRECEEDING WORD OR CHARACTER), OR BY THE END OF THE 80
CHARACTER CARD. ROUTINE DOES NOT BLANK OUT ANY OF THE ARGUMENTS. USER
SHOULD MAKE SURE ICARD IS FILLED WITH BLANKS OR CHARACTERS PRIOR TO CALLIN.
(THE NULL SET IS NOT A BLANK, AND WILL MAKE A PART HAVE TRAILING BLANKS)
ROUTINE IGNORES OTHER THAN ABOVE EQUALS, EXCEPT AS AN ENDING DELIMITER
THERE AMY BE NO MORE THAN 9 EQUAL SIGNS IN ICARD. IF GREATER THAN 9,
ISTATS(1) RETURNED AS -100.

EXAMPLE:

ZR=IN A = CORPS B=OHIO RIVER, P = FLOW F = PLAN D ZD = XXX

RETURN:

ISTATS(1) = 4, A = CORPS ISTATS(2) = 10, B = OHIO RIVER ISTATS(3) = 4, C = FLOW ISTATS(4) = -1, D = ISTATS(5) = -1, E = ISTATS(6) = 6, F = PLAN D

DIAGNOSTICS

ISTATS(1) = -100 *TO MANY EQUAL SIGNS IN ICARD - MAY HAVE NO MORE THAN 9. PAGE 12

ZREAD - READ A RECORD FROM THE DSS

CALL SEQUENCE

CALL ZREAD(IFLTAB(), KNAME(), NNAMCR, HEAD(), NHEAD, DATA(), NDATA, IFLAN, LFOUND)

PARAMETERS

IFLTAB, KNAME, NNAMCR, LFOUND - ALL DESCRIBED ABOVE.

DATA, HEAD - ARRAYS WHICH WILL BE FILLED WITH INFORMATION
IF FOUND ON THE DSS
IPLAN - ACTION FOR UPDATING THE VALUES OF NDATA AND NHEAD
FOR: IPLAN=1, UPDATE NHEAD AND NDATA TO ACTUAL LENGTHS OF ARRAYS
STORED.
IPLAN=OTPER, DO NOT UPDATE

DESCRIPTION

CHECK THE DSS FOR NAMED RECORD, AND READ INTO HEAD AND DATA IF THE KNAME IS FOUND.

NOTE: THE LENGTH OF THE RETURNED ARRAY WILL BE THE SMALLER OF THE INPUT VALUE (NHEAD OR NDATA) AND THE ACTUAL VALUE. IF NHEAD AND NDATA ARE NOT KNOWN, THE FULL RECORD CAN BE ACCESSED BY MAKING NHEAD AND NDATA LARGE.

DIAGNOSTICS

-UNKNOWN NAME ON FILE #CANNOT FIND NAMED RECORD

(

ZGTDTS - GET DATA TIME SERRIES

CALL SEQUENCE

CALL ZGTDTS(IFLTAB(), IA(), NA, IB(), NB, IC(), NC, IF(), NF, JULSD, ISTIME, JULET, IETIME, INTRVL, IHEAD(), NHEAD, BUFFER(), DATA(), NDATA, IUNITS(), ITYPE(), ISTAT)

PARAMETERS

IFILTAB - DSS WORK FILE ASSOCIATED WITH THE FILE OPENED, DESCRIBED ABOVE

IA, IB, IC, IF - CHARACTER STRING ARRAYS WHICH WILL BE FORMED INTO THE PATHNAME(S), (EXCLUDING THE DATE AND TIME INTERVAL PARTS)

NA,NB,NC,NF - THE ASSOCIATED STRING LENGTHS IN TERMS OF THE CHARACTER COUNT INTEGERS

JULSD - STARTING DATE IN JULIAN DAYS, DAYS SINCE 01JAN1900 (USE SUBROUTINES IYMDJL, OR MILJUL TO GET FROM STANDARD TYPE DATE TO JULIAN)

ISTIME - STARTING TIME IN MINUTES AFTER MIDNIGHT OF JULSD

JULED - ENDING DATE IN JULIAN DAYS

IETIME - ENDING TIME IN MINUTES AFTER MIDNIGHT OF JULED

INTRVL - TIME INTERVAL BETWEEN DATA DESIRED, IN MINUTES

IHEAD, NHEAD - HEADER ARRAY AND NUMBER OF HEADER WORDS DESIRED NHEAD SHOULD BE, GE. 15, AND IHEAD DIMESNIONED TO THAT NHEAD IS RETURNED WITH ACTUAL NUMBER IN HEADER IF LESS THAN ASKED FOR

BUFFER - A SCRATCH ARRAY TO BE USED INTERNALLY BY ZGTDTS TO MOVE BLOCKS AROUND. BUFFER SHOULD BE DIMENSIONED TO BE AT LEAST AS LARGE AS THE LARGEST DATA BLOCK IN A RECORD TO BE INCOUNTERED. IF BUFFER IS DIMENSIONED TO 750 (REAL), ALL INTERVALS WILL BE HANDLED.

DATA - AN ARRAY RETURNED WITH THE DATA DESIRED (REAL NUMBERS)

NDATA - THE DIMENSION LIMIT OF ARRAY DATA. NDATA IS RETURNED WITH THE ACTUAL NUMBER OF DATA IN DATA.

IUNITS, ITYPE - ARRAYS RETURNED WITH THE UNITS AND TYPE OF DATA TAKEN FROM THE HEADER. (EG. CFS AND PER-AVER) SHOULD BE DIMENSIONED TO HOLD 8 CHARACTERS (ON THE HARRIS DIMENSION TO 2, INTEGER*6).

ISTAT - A STATUS PARAMETER RETURNED ON THE SUCCESSFULNESS
OF THE CALL. IF ISTAT .GE. 10, A FATAL ERROR OCCURED
AND NO DATA WAS RETURNED. A LIST OF ISTAT ERRORS FOLLOWS.

DESCRIPTION

ZGTDTS IS A HIGHER LEVEL CALL TO READ DSS DATA. GIVEN A TIME WINDOW, ZGTDTS WILL FORM THE NECESSARY PATHNAMES AND RETRIEVE DATA FOR THE TIMES GIVEN, CROSSING TIME BOUNDRY BLOCKS, IF NECESSARY. FOR EXAMPLE, IF THE USER WANTS DAILY DATA FROM 14MAR67 TO 25APR69, ONE CALL TO ZGTDTS WILL RETRIEVE THAT DATA AND RETURN IT IN THE ARRAY DATA, WITH THE NUMBER OF DATA BEING NDATA. THE ROUTINE CAN EQUALLY WELL RETURN ONE PIECE OF DATA AT A DESIRED TIME BY SETTING JULED = JULSD AND IETIME = ISTIME.

REMARKS

MISSING DATA - IF A RECORD IS NOT FOUND FOR WHICH DATA WAS ASKED FOR, A WARNING MESSAGE IS PRINTED WITH THE PATHNAME OF THE RECORD MISSING. A VAUE OF -902.0 IS GIVEN FOR EACH OF THE MISSING DATA. IF DATA IS MISSING INSIDE OF A RECORD, A VALUE OF -901.0 IS GIVEN FOR THESE DATA. IN EACH CASE, ISTAT IS CHANGED TO IDENTIFY THIS.

MILITARY STYLE DATES AND TIMES, AND YEAR, MONTH, DAY STYLE DATES CAN BE TRANSFORMED INTO JULIAN USING THE BATE ROUTINES IN ULIB. THE ROUTINE INCTIM MAY BE USEFUL IN DETERIMING THE ENDING DATE. THESE ARE DOCUMENTED IN HECULIB (DOC*ULIB)

"SAFE" DIMENSIONING IS AS FOLLOWS: DIMENSION IFLTAB(1200), BUFFER(750), IHEAD(15), DATA(NDATA)
INTEGER*6 IUNITS(2), ITYPE(2), IA(), IB(), IC(), IF()
WHERE NDATA IS LARGEST AMOUNT OF DATA EVER EXPECTED.

DIAGNOSTICS

ISTAT DESCRIPTION

- 0 **OPERATION PREFORMED SUCCESSFULLY**
- MISSING DATA INSIDE A RECORD (-901.0)
 MISSING RECORD(S) (-902.0), BUT SOME VALID DATA FOUND
 MISSING RECORD(S), AND MISSING DATA INSIDE A RECORD
 DETECTED, BUT SOME VALID DATA WAS FOUND.
 NO VALID DATA WAS FOUND (ALL -901.0, AND -902.0) 3
- RESERVED FOR INTERPOLATED DATA
 - -- FATAL ERRORS --
- 11

- 12 20 21 22
- USER ASKED FOR MORE DATA (VIA DATES, TIME) THAN ARRAY DATA WAS DIMENSONED FOR (NDATA).
 A NON-STANDARD INTERVAL WAS PASSED INTERVALS NOT EQUAL (THIS WILL NOT OCCUR AT THIS TIME)
 A BAD STARTING DATE WAS DETECTED DATA REQUESTED NOT ON THE STANDARD TIME INTERVAL EG. DAILY DATA REQUESTED, RUT GIVEN STARTING TIME WAS 8 A.M. (TIME HAS TO BE MIDNIGHT FOR DAILY IE ISTIME = 0 OR 1440)

NO DATA WILL BE RETURNED WITH A FATAL ERROR. ERRORS 20 AND 21 SHOULD NOT OCCUR. IF THEY DO, ROUTINE MAY HAVE BEEN WRITTEN OVER.

ZGTDTA - GET DATA TIME SERRIES ALTERNATIVE

CALL SEQUENCE

CALL ZGTDTA(IFILTAB(), ME(), NNAMCR(), ITIME(), IHEAD(), NHEAD, DATA(), NDATA, BUFFER(), ISTAT)

PARAMETERS

IFILTAR - DSS WORK ARRAY

KNAME - CHARACTER STRING PATHNAME
NNAMCR - NUMBER OF CHARACTERS IN KNAME
ITIME - A ARRAY OF FOUR VALUES:

ITIME(1) - JULIAN STARTING DATE = JULSD
ITIME(2) - STARTING TIME = ISTIME
ITIME(3) - JULIAN ENDING DATE = JULED
ITIME(4) - ENDING TIME = IETIME

REMAINDER DISCUSSED IN ZGTDTS

DESCRIPTION

ZGTDTA IS A SHORTENED CALL TO THE ROUTINE ZGTDTS, USEFUL IF THE PATHNAME HAS ALREADY BEEN FORMED. PARAMETERS AND USAGE ARE DISCUSSED IN ZGTDTS.

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4

ZWRITE - WRITE A RECORD TO THE DSS

CALL SEQUENCE

CALL ZWRITE(IFLTAB(), KNAME(), MNAMCR, HEAD(), NHEAD, DATA(), NDATA, IPLAN, LFOUND)

PARAMETERS

IFLTAB - INTEGER ARRAY. SCRATCH AREA NEED, AS DISCUSSED ABOVE KNAME - CONTAINS THE CHARACTER STRING NAME TO USE FOR WRITING THE RECORD.

NNAMCR - NUMBER OF CHARACTERS IN KNAME, AS DESCRIBED ABOVE. HEAD, DATA - ARRAYS OF INFORMATION TO SAVE, AS ABOVE. IPLAN - ACTION DEPENDING ON WHETHER NAME IS PREVIOUSLY IN DSS: FOR: IPLAN=1, ONLY WRITE IF NEW NAME FOR: IPLAN=2, ONLY WRITE IF OLD NAME FOR: IPLAN=OTHER, ALWAYS WRITE

LFOUND - LOGICAL .TRUE. RETURNED IF OLD NAME, ELSE .FALSE.

DESCRIPTION

ENTER INTO DSS UNDER THE NAME KNAME THE SPECIFIED, POSSIBLY ZERO, LENGTH ARRAYS HEAD AND DATA.

DIAGNOSTICS

-NAME EXISTED ON NEW WRITE REQUEST * IPLAN CONFLICT * IPLAN CONFLICT * IPLAN CONFLICT

ZPTDTS - PUT DATA TIME SERRIES

CALL SEQUENCE

CALL ZPTDTS(IFLTAB(), IA(), NA, IB(), NB, IC(), NC, IF(), NF, JULSD, ISTIME, JULET, IETIME, INTRVL, IHEAD(), NHEAD, BUFFER(), DATA(), NDATA, IUNITS(), ITYPE(), ISTAT)

PARAMETERS

IFILTAB - DSS WORK FILE ASSOCIATED WITH THE FILE OPENED, DESCRIBED ABOVE

IA, IB, IC, IF - CHARACTER STRING ARRAYS WHICH WILL BE FORMED INTO THE PATHNAME(S), (EXCLUDING THE DATE AND TIME INTERVAL PARTS)

NA,NB,NC,NF - THE ASSOCIATED STRING LENGTHS IN TERMS OF THE CHARACTER COUNT INTEGERS

JULSD - STARTING DATE IN JULIAN DAYS, DAYS SINCE 01JAN1900 (USE SUBROUTINES IYMDJL, OR MILJUL TO GET FROM STANDARD TYPE DATE TO JULIAN)

ISTIME - STARTING TIME IN MINUTES AFTER MIDNIGHT OF JULSD

JULED - ENDING DATE IN JULIAN DAYS

IETIME - ENDING TIME IN MINUTES AFTER MIDNIGHT OF JULED

INTRUL - TIME INTERVAL BETWEEN DATA, IN MINUTES

IHEAD, NHEAD - HEADER ARRAY AND NUMBER OF HEADER WORDS.
DIMENSION IHEAD TO AT LEAST 15, AND SET NHEAD TO 15

BUFFER - A SCRATCH ARRAY TO BE USED INTERNALLY BY ZFTDTS TO MOVE BLOCKS AROUND. BUFFER SHOULD BE DIMENSIONED TO BE AT LEAST AS LARGE AS THE LARGEST DATA BLOCK IN A RECORD TO BE ENCOUNTERED. IF BUFFER IS DIMENSIONED TO 750 (REAL), ALL INTERVALS WILL BE HANDLED.

DATA - AN ARRAY CONTAINING THE DATA TO BE STORED

NDATA - THE DIMENSION LIMIT OF ARRAY DATA. NDATA IS RETURNED WITH THE ACTUAL NUMBER OF DATA STORED.

IUNITS, ITYPE - ARRAYS CONTAINING THE UNITS AND TYPE OF DATA TO BE PUT IN THE HEADER. (EG. CFS AND PER-AVER) SHOULD BE DIMENSIONED TO HOLD 8 CHARACTERS (ON THE HARRIS DIMENSION TO 2, INTEGER*6).

ISTAT - A STATUS PARAMETER RETURNED ON THE SUCCESSFULNESS OF THE CALL. IF ISTAT .GE. 10, A FATAL ERROR OCCURED AND NO DATA WAS STORED. A LIST OF ISTAT ERRORS FOLLOWS.

DESCRIPTION

ZPTDTS IS A HIGHER LEVEL CALL TO WRITE DATA TO DSS. GIVEN A TIME WINDOW, ZPTDTS WILL FORM THE NECESSARY PATHNAMES AND WRITE THE DATA FOR THE TIMES GIVEN, CROSSING TIME BOUNDRY BLOCKS, IF NECESSARY. FOR EXAMPLE, IF THE USER HAS DAILY DATA FROM 14MAR67 TO 25APR69, ONE CALL TO ZPTDTS WILL WRITE THE DATA TO DSS. USER MUST OPEN AND CLOSE THE FILE SEPERATLY FROM ZPDTS.

REMARKS

IF THE DSS RECORD ONE IS WRITTING TO PREVIOUSLY EXISTS, THE PROGRAM THE REOCRD THEN INSERT THE NEW DATA, PRESERVING OLD DATA THE RECORD THAT EXISTS AT TIME SPAN. THIS ALLOWS THE USER TO EASILY EXTEND A RECORD OF DATA. FOR EXAMPLE, IF DURING ONE RUN DAILY DATA IS WRITTEN TO DSS FOR THE TIME SPAN 13NOV67 TO 15MAR68, A LATER RUN CAN WRITE DATA FROM 16MAR68 ON, LEAVING THE PREVIOUS DATA INTACT.

MILITARY STYLE DATES AND TIMES, AND YEAR, MONTH, DAY STYLE DATES CAN BE TRANSFORMED INTO JULIAN USING THE DATE ROUTINES IN ULIB. THE ROUTINE INCTIM MAY BE USEFUL IN DETERIMING THE ENDING DATE. THESE ARE DOCUMENTED IN HECULIB (DOC*ULIB)

"SAFE" DIMENSIONING IS AS FOLLOWS: DIMENSION IFLTAB(1200), BUFFER(750), IHEAD(15), DATA(NDATA) INTEGER*6 IUNITS(2), ITYPE(2), IA(), IR(), IC(), IF() WHERE NDATA IS LARGEST AMOUNT OF DATA EVER EXPECTED.

DIAGNOSTICS

ISTAT DESCRIPTION

OPERATION PREFORMED SUCCESSFULLY

-- FATAL ERRORS --

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USER ASKED TO STORE MORE DATA (VIA DATES, TIME) THAN ARRAY DATA WAS DIMENSONED FOR (NDATA). A NON-STANDARD INTERVAL WAS PASSED INTERVALS NOT EQUAL (THIS WILL NOT OCCUR AT THIS TIME) A BAD STARTING DATE WAS DETECTED DATA GIVEN NOT ON THE STANDARD TIME INTERVAL EG. DAILY DATA GIVEN, BUT THE STARTING TIME WAS 8 A.M. (TIME HAS TO BE MIDNIGHT FOR DAILY - IE ISTIME = 0 OR 1440)

NO DATA WILL BE STORED WITH A FATAL ERROR. ERRORS 20 AND 21 SHOULD NOT OCCUR. IF THEY DO, ROUTINE MAY HAVE BEEN WRITTEN OVER.

ZDLETE - DELETE A RECORD FROM THE FILE.

CALL SEQUENCE

CALL ZDLETE(IFLTAB(), KNAME(), NNAMCR, LFOUND)

PARAMETERS

IFLTAB, KNAME, NNAMCR, LFOUND - DESCRIBED ABOVE DESCRIPTION

CAUSES THE NAMED RECORD TO BE DELETED IF FOUND. THE PATHNAME CAN THEN BE REUSED. NOTE: THE FILE SPACE TAKEN BY THE DELETED RECORD BECOMES INACTIVE AND WILL BE REMOVED BY A COMPRESS ROUTINE.

DIAGNOSTICS

-UNKNOWN NAME ON FILE

-RECORD DOESN'T EXIST AS NAMED

BUGS

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(

ZCHECK - CHECK IF NAME CORRESPONDS TO ANY RECORD.

CALL SEQUENCE

CALL ZCHECK(IFLTAB(), KNAME(), NNAMCR, NHEAD, NDATA, LFOUND)

PARAMETERS

IFLTAB - INTEGER ARRAY, SCRATCH AREA NEEDED, AS DISCUSSED ABOVE.

KNAME - CONTAINS THE CHARACTER STRING NAME TO CHECK NAMER OF CHARACTERS IN KNAME, AS DESCRIBED ABOVE. NHEAD, NDATA - IF RECORD FOUND WILL BE STUFFED WITH LENGTH IN WORDS OF THE STORED ARRAYS DATA AND HEAD LFOUND - LOGICAL .TRUE. RETURNED IF NAME IS ON DSS, .FALSE. OTHERWISE.

DESCRIPTION

CHECK THE DSS FILE FOR THE NAMED RECORD AND RETURN VALUES FOR NHEAD, NDATA AND LFOUND. DO NOT CHANGE NHEAD OR NDATA IF NOT FOUND.

DIAGNOSTICS

ZLIST - LIST ALL OF THE RECORD NAMES IN A FILE.

CALL SEQUENCE

CALL ZLIST(IFLTAB)

PARAMETERS

IFLTAB - INTEGER ARRAY, SCRATCH AREA FOR PARTICULAR DSS FILE WISHED TO LIST, AS DISCUSSED ABOVE.

DESCRIPTION

START ON A NEW PAGE, AND LIST RECORD NAMES, CREATION TIME, AND RECORD LENGTHS FOR THE DSS FILE ASSOCIATED WITH IFLTAB.

DIAGNOSTICS

ZCLOSE - CLOSE DSS FILE SO IT MAY BE SAVEH.

CALL SEQUENCE

CALL ZCLOSE(IFLTAB)

PARAMETERS

IFLTAB - INTEGER ARRAY, SCRATCH AREA FOR PARTICULAR DSS FILE TO CLOSE, AS DISCUSSED ABOVE

DESCRIPTION

CAUSE ANY FINAL TRANSFERS TO THE PHYSICAL DISK FILE AND CALL A SYSTEM DEPENDENT CLOSING ROUTINE. RELEASE THE SCRATCH AREA USED IN IFLTAB, AND PRINT A CLOSING MESSAGE TO OUTPUT.

DIAGNOSTICS

INTERNAL DETAILS

DSS IS ARRANGED AS A RANDOM ACCESS FILE USING FIXED RECORD LENGTHS AND AN INTERNAL BUFFERING SYSTEM TO COMPACT INFORMATION. SPACE IN THE FILE TABLE ARRAY (IFLTAB) IS USED FOR THE BUFFER. IF RANDOM ACCESS IS NOT AVAILABLE, SEQUENTIAL ACCESS AT A LOWER LEVEL, WITH REWIND AND BACKSPACE, CAN BE USED TO SIMULATE IT.

THE KEYS USED TO ACCESS THE LOGICAL RECORDS ON THE FILE ARE RECORD NAMES, WHICH CONSIST OF AN ARBITRARY LENGTH STRING. THE STRING IS HASHED INTO AN INTEGER VALUE BETWEEN ONE AND MAXH (MAXHASH), AND THE VALUE IS CHECKED FOR A CORRESPONDING ENTRY IN A FILE DIRECTORY. THE DIRECTORY IS HIERARCHICAL OR TREE-LIKE, AND WILL BE DISCUSSED BELOW. IF THE NAME STRING CONTAINS EMBEDDED DELIMITER CHARACTERS, MDLH, USUALLY A SLASH (/), THE ENCLOSED SUBSTRINGS WILL BE HASHED SEPARATELY, AND THE RESULTING SEQUENCE OF HASH VALUES FROM SCANNING THE NAME STRING LEFT TO RIGHT, WILL BE USED TO STEP DOWN THROUGH THE DIRECTORY TREE, ONE LEVEL FOR EACH VALUE, ALWAYS STARTING FROM THE ROOT NODE OF THE TREE (TREES ARE TO BE PICTURED UPSIDE-DOWN). THE MAXIMUM NUMBER OF PATHNAME SUBSTRINGS, MAXP, CORRESPONDS TO THE MAXIMUM TREE DEPTH, AND ALONG WITH MAXH AND HDLM ARE SYSTEM PARAMETERS.

IF, WHILE ATTEMPTING TO WRITE A RECORD WITH ZWRITE, A NODE FOR THE NEXT HASH VALUE DOES NOT EXIST, ONE WILL APPROPRIATELY BE CREATED. THE ACTUAL NAME STRING WILL BE WRITTEN TO THE FILE FROM THE LAST NODE IN THE HASH VALUE SEQUENCE. IF THERE ARE NAMES WITH THE SAME HASH SEQUENCES, THE NAMES WILL FORM A CHAIN OF NAMES WHICH MAY BE SEARCHED DURING A RETRIEVAL REQUEST. ALONG WITH THE NAME IS WRITTEN A POINTER TO AN INFORMATION BLOCK FOR THE RECORD, WHICH CONTAINS CREATION, LENGTH, AND LOCATION INFORMATION ASSOCIATED WITH THE NAME, AND POINTERS TO THE ACTUAL SAVED INFORMATION.

THE VARIOUS TYPES OF RECORDS IN THE FILE WILL BE DESCRIBED NEXT.

- PERM THE FIRST RECORD, AT THE TOP OF THE FILE, CONTAINS INFORMATION THAT IS PERMANENTLY ASSOCIATED AND STORED WITH THE FILE. IT INCLUDES A ADDRESS POINTER TO THE ROOT NODE, FILE SIZE IN WORDS, FILE SIZE IN RECORDS. IT IS INITIALIZED WHEN A FILE IS OPENED IN ZOPEN, AND UPDATED BEFORE CLOSING BY ZCLOSE.
- ROOT THE SECOND RECORD IS THE ROOT NODE, FROM WHICH ALL DIRECTORY SEARCHING BEGINS. IT IS CREATED BY ZOPEN IF THE FILE WAS NOT PRE-EXISTING, AND HAS NO PARENT NODE. OTHERWISE, IT IS LIKE ANY OTHER NODE OF THE DIRECTORY.
- NODE THE DIRECTORY IS MADE UP OF UNIT PIECES, CALLED NODES, WHICH, TAKEN TOGETHER, FORM A TREE-LIKE NETWORK. EACH NODE IS A LIST OF ALTERNATIVE POINTERS WHICH WILL BE CHOSEN, DEPENDING ON THE VALUE OF THE HASHED NAME SEQUENCE. THERE WILL BE ONE NODE ACCESSED CORRESPONDING TO EACH OF THE VALUES OF THIS SEQUENCE, PAGE 24

COUNTING THE ROOT NODE. THE LENGTH OF A NODE DEPENDS ON MAX HASH PARAMETER, AND IS TWO TIMES MAXH PLUS TWO. THE FIRST MAXH POINTERS ARE USED TO GO TO OTHER NODES. THE LAST VALUE OF A HASHED NAME SEQUENCE USES A POINTER FROM THE SECOND MAXH POINTERS IN THE NODE. THE LAST TWO POINTERS ARE FOR THE FILE ADDRESS OF THE NODE, AND ITS PREDECESSOR NODE'S ADDRESS. ZERO VALUE INDICATES A NULL POINTER, THAT IS, NO SUCH DESCENDANT NODE OR RECORD EXIST.

- FAKE THE LAST VALUE OF A NAME HASH VALUE SEQUENCE IS USED TO POINT FROM THE LAST NODE ACCESSED IN THE TREE, TO THE TOP OF A CHAINED LIST OF NAMES. TO MAKE THE CONTROL OF THE LIST UNIFORM, A FAKE HEAD OF THE LIST IS USED TO POINT TO THE ACTUAL FIRST NAME ON THE LIST.
- NAME TO TAKE CARE OF THE POSSIBILITY OF HASHING COLLISIONS, THE ACTUAL NAMES OF RECORDS ARE STORED ON THE FILE IN A LIST, ALONG WITH NON-ZERO POINTERS TO ANY SUCCEEDING NAMES IN THE CHAIN. ALSO INCLUDED IS A CHARACTER COUNT FOR THE NAME, AND A POINTER TO THE ASSOCIATED RECORD BLOCK.
- BLOCK FOR EACH NAMED RECORD, THE DSS MAINTAINS INFORMATION REGARDING CREATION TIME, RECORD LENGTHS, VERSION NUMBER, WRITING PROGRAM AND DATA AND HEAD LOCATIONS.
- DATA, HEAD CONTAIN THE ACTUAL INFORMATION FROM THE USER. THERE ARE TWO COMMON BLOCKS ASSOCIATED WITH DSS. BLOCK /WORDS/ IS USED BY THE STRING MANIPULATION PACKAGE, DESCRIBED IN THE LATER SECTION, TO EFFICIENTLY PACK CHARACTERS INTO MACHINE WORDS. BLOCK /ZFS/ CONTAINS DSS PARAMETERS, SAVE VARIABLES BETWEEN SUBROUTINE ACTIVATIONS, AND POINTERS INTO THE SCRATCH AREA IFLTAB.

COMMON BLOCK /ZFS/	' VARIABLES ************************************
GROUP 1:	•••••
KDATE	DATE OF FIRST DSS CALL OF THIS JOB
KTIME	TIME OF FIRST DSS CALL OF THIS JOB
KPROG	CALLING PROGRAM NAME TO ZSET TO SAVE IN RECORD BLOCK. DEFAULT IS 4HNONE.
KFSIZE	LENGTH OF FILE IN WORDS
KGOT	NUMBER OF NODES FOUND FOR NAME REING CHECKED

NUMBER OF VALUES IN HASHED NAME SEQUENCE

GROUP 2: POINTERS IN IFLTABFILE MANAGEMENT.....

KNCD

KSYS	POINTER TO HOST COMPUTER FILE TABLE AREA
KFNH	POINTER TO FILE NAME
KOPN	POINTER TO WORK FOR FILE NAME WHILE OPENED FILE
MAXP	MAXIMUM PATHNAME LENGTH FOR SYSTEM
HAXH	MAXIMUM HASHING VALUE FOR SYSTEM
MDLM	LEFT JUSTIFIED DELIMITER CHARACTER FOR SYSTEM
KNND	NUMBER OF WORDS IN A NODE
KLRT	POINTER TO LOCATION OF ROOT NODE
KFSZ	POINTER TO FILE SIZE IN WORDS
KDEAD, KDEADS	POINTER(S) TO INACTIVE SPACE IN FILE
KNRC	POINTER TO NUMBER OF RECORDS IN FILE
KNOD	POINTER TO NODE AREA OF IFLTAB
KLCD	POINTER TO DESCENDANT NODE POINTERS IN CURRENT NODE
KLRC 26	POINTER TO FAKE NAME POINTER LIST IN CURRENT
	KFNH KOPN HAXP HAXH HDLH KNND KLRT KFSZ KDEAD, KDEADS KNRC KNOD KLCD

NODE

KLHY	POINTER	IN	NODE	0F	ITS	OWN	FILE	ADDRESS
------	---------	----	------	----	-----	-----	------	---------

KNPRM NUMBER OF WORDS OF PERM, FIRST RECORD IN FILE, TO SAVE

GROUP 3: POINTERS IN IFLTABRECORD MANAGEMENT.....

KCOD	POINTER TO BEGINNING OF HASHED NAME CODE VALUES
KCDT	POINTER TO CREATION DATE FOR RECORD
KCTH	POINTER TO CREATION TIME FOR RECORD
DUSN	POINTER TO VERSION NUMBER FOR RECORD
KRNM	POINTER TO RECORD NUMBER FOR RECORD
KNHD	POINTER TO NUMBER OF WORDS IN HEAD
KNDT	POINTER TO NUMBER OF WORDS IN DATA
KNNM	POINTER TO NUMBER OF CHARACTERS IN NAME
KLHD	POINTER TO LOCATION OF HEAD IN FILE
KLDT	POINTER TO LOCATION OF DATA IN FILE
KLNM	POINTER TO LOCATION OF NAME IN FILE
KPRG	POINTER TO PROGRAM NAME WHICH WROTE RECORD
KLBK	POINTER TO LOCATION OF BLOCK IN FILE
KNBLK	NUMBER OF WORDS IN A BLOCK
KRIK	POINTER TO FIRST WORD OF BLOCK IN IRCTAR

GROUP 4: IFLTA	BBUFFER MANAGEMENT
KBUF, KBUFS	POINTERS TO BUFFER SIZE IN WORDS
KSBUF, KSBUF	FIRST CELL OF BUFFER AREA
KWRIT, KWRITS	POINTER(S) TO FLAG THAT IS SET IF CURRENT BUFFER CONTAINS INFORMATION THAT NEEDS TO BE WRITTEN TO FILE BEFORE CHANGING BUFFERS.
KCURR, KCURRS	POINTER(S) TO THE CURRENT BUFFER NUMBER.
GROUP 5: OTHER	S
KLPR	POINTER IN IFLTAB OF NODE PREDECESSOR LOCATION
KPRM	POINTER IN IFLTAB TO FIRST WORD OF PERM
KNNOD	NUMBER OF WORDS IN A NODE
KXNAHE	EXTRA NAME ARRAYS, USED WHILE SEARCHING FOR NAME
KPRNT	PARENT SUBSCRIPT TO KXNAME
KXMY	LOCATIONS OF EXTRA NAMES
DBUG	LOGICAL FLAG TO CONTROL DIAGNOSTIC OUTPUT
DLETE	LOGICAL FLAG THAT CONTROLS DELETIONS IN ZCHECK
ИЕМ	LOGICAL FLAG INDICATING STATUS OF FILE (NEW OR OLD)
LVER	VERSION NUMBER AS USED IN RECORD MANAGEMENT ROUTINES
NAP	LOGICAL FLAG TO CONTROL EXTRA OUTPUT IN ZLIST

NON-SUPPLIED SUBROUTINE **********************************

NAME	CALLED FROM	PURPOSE
DATE	ZLIST, ZINIT	ENTER CURRENT DATE IN PARAMETER
TIME	ZLIST, ZINIT	ENTER CURRENT TIME IN PARAMETER
Q9FILE	ZOPEN	OPEN A FILE, USING GIVEN BUFFER FUR SYSTEM TABLES
Q9CLOSE	ZCLOSE	CLOSE A FILE, RELEASE A BUFFER
R9RWRTR	ZPTREC	WRITE VARIABLE LENGTH RANDOM ACCESS ENDING WITH RECORD MARK OR OTHER EXTRA WORD
R9RE4DW	ZGTREC	READ VARIABLE LENGTH RANDOM ACCESS

UTILITIES: PROGRAMS AND SUBROUTINES

ZLIST -----

THIS PROGRAM INVENTORIES A DSS FILE AS DOES THE SUBROUTINE ZLIST. IT INCLUDES THE OPTION OF HAVING A FILE MADE OF THE PATHNAMES IN THE FILE. THIS OUTPUT FILE IS IN THE CORRECT FORMAT TO USE IN ZDLETE, ZCHECK, AND ZCOPY.

CALL SEQUENCE: ZLIST FILE=AREANAME (MAP=NAMEFILE)

WHERE AREANAME IS THE NAME OF THE DSS FILE, AND NAMEFILE IS THE NAME OF THE OPTIONALLY GENERATED PATHNAME FILE. IF A "MAP=" CALL IS MADE, THE OUTPUT FILE PATHNAMES WILL START IN COLUMN 1, USING SLASHES AS DELIMITERS.

ZCOMPRS ----

THIS PROGRAM COMPRESSES THE DSS FILE, ELIMINATING INACTIVE SPACE THAT MAY HAVE BEEN CREATED BY REWRITING, RENAMING, OR DELETING. SINCE TEMPORARY FILE U2 IS USED BY THE PROGRAM, BE SURE ITS CONTENTS ARE RELOCATED IF NEED BE.

CALL SEQUENCE: ZCOMPRS FILE=AREANAME

WHERE AREANAME IS THE NAME OF THE FILE TO BE COMPRESSED.

ZDLETE ----

THIS PROGRAM DELETES RECORDS FROM A DSS FILE, GIVEN THE PATHNAME.
IT MAY BE RUN WITH INTERACTIVE INPUT OR WITH A AN INPUT FILE.

CALL SEQUENCE: ZDLETE FILE=AREANAME (INPUT=NAMELIST)

WHERE AREANAME IS THE NAME OF THE DSS FILE TO BE EDITED AND NAMELIST IS THE OPTIONAL INPUT FILE CONTAINING THE PATHNAMES TO BE DELETED. IF "INPUT=" IS NOT USED, PATHNAMES ARE TO BE INPUT INTERACTIVELY. THE INPUT PATHNAMES SHOULD START IN COLUMN ONE AND USE SLASHES AS DELIMITERS.

ZRENAME

THIS PROGRAM CHANGES THE PATHNAMES OF DSS RECORDS.

CALL SEQUENCE: ZRENAME FILE=AREANAME (INPUT=NAMELIST)

WHERE AREANAME IS THE NAME OF THE DSS FILE, AND NAMELIST IS THE OPTIONAL INPUT FILE OF PATHNAMES. IF "INPUT=" IS NOT USED, PATHNAMES ARE TO BE INPUT INTERACTIVELY.
THE INPUT PATHNAMES SHOULD START IN COLUMN ONE
AND USE SLASHES AS DELIMITERS.
PATHNAME SEQUENCE MUST BE OLD, NEW, OLD, NEW, ... WITH EACH PATHNAME ON A SEPARATE LINE.

ZCDPY --

THIS PROGRAM CAN BE USED TO ACCOMPLISH ANY ONE OF THESE ACTIONS:

1) COPY ALL OF A DSS FILE TO A NEW FILE 2) MERGE ALL OF A DSS FILE WITH AN EXISTING FILE 3) COPY/MERGE PART OF A DSS FILE TO ANOTHER FILE.

CALL SEQUENCE: ZCOPY FILE=AREANAME TO=NEXTFILE (I=ALL OR I=NAMELIST)

WHERE AREANAME IS THE NAME OF THE ORIGINAL DSS FILE TO BE COPIED, AND NEXTFILE IS THE NAME OF THE FILE IN WHICH TO PLACE THE COPY (FOR COPYING), OR THE NAME OF THE FILE WITH WHICH TO MERGE (FOR MERGING). NAMELIST IS THE NAME OF THE FILE CONTAINING THE PATHNAMES TO BE MOVED (FOR A PARTIAL MERGE OR COPY). IF "I=" IS OMITTED, THESE PATHNAMES WILL BE EXPECTED INTERACTIVELY. WHEN MOVING PART OF A FILE, THE INPUT PATHNAMES SHOULD START IN COLUMN ONE AND USE SLASHES AS DELIMITERS. IF ALL OF THE FIRST FILE IS TO BE MOVED, USE "I=ALL".

NOTE THAT IN ALL CASES THE ORIGINAL FILE IS UNCHANGED.

ZCOPY EXAMPLES:

ZCOPY FILE=DSSOUT TO=NEWDSS I=ALL DESCOUT WILL BE MERGED INTO NEWDSS.

IF NEWDSS WAS A NORMPTY FILE, ALL OF THE DATA IN DESCOUT WILL BE MERGED INTO NEWDSS.

IF NEWDSS IS AN EMPTY FILE, DSSOUT WILL BE DUPLICATED AND THE COPY WILL BE CALLED NEWDSS.

ZCOPY FILE=DSSOUT TO=NEWDSS I=NAMES ONLY THOSE PATHNAMES IN THE INPUT FILE "NAMES" WILL BE DUPLICATED IN THE (NEW OR OLD) FILE NEWDSS.

ZCOPY FILE=DSSOUT TO=NEWDSS SAME AS ABOVE. PATHNAMES TO BE INPUT INTERACTIVELY PAGE 31

ZCHECK -

SIMILAR TO SUBROUTINE ZCHECK, THIS PROGRAM SEARCHES A DSS FILE FOR THE RECORD CORRESPONDING TO THE PATHNAME INPUT. IF FOUND, THE SIZE OF THE HEADER AND DATA ARRAYS ARE RETURNED.

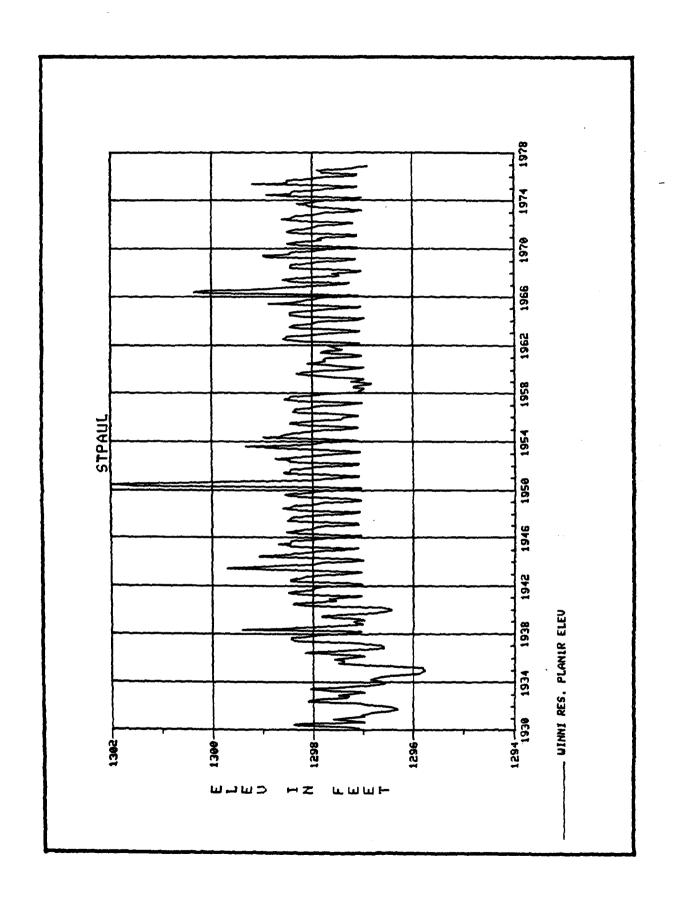
CALL SEQUENCE: ZCHECK FILE=AREANAME (INPUT=NAMELIST)
WHERE AREANAME IS THE NAME OF THE DSS FILE TO
CHECK, AND NAMELIST IS THE NAME OF THE OPTIONAL
INPUT FILE CONTAINING THE PATHNAMES TO BE CHECKED.
IF "IMPUT=" IS NOT USED, THE PATHNAMES
WILL BE EXPECTED INTERACTIVELY.
THE INPUT PATHNAMES SHOULD START IN COLUMN ONE
AND USE SLASHES AS DELIMITERS.

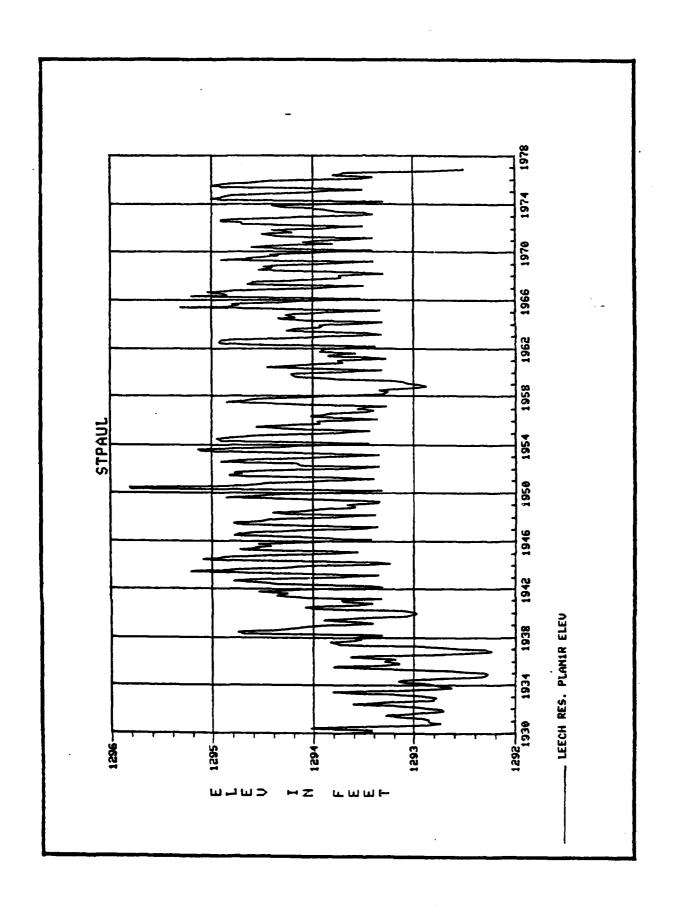
APPENDIX E

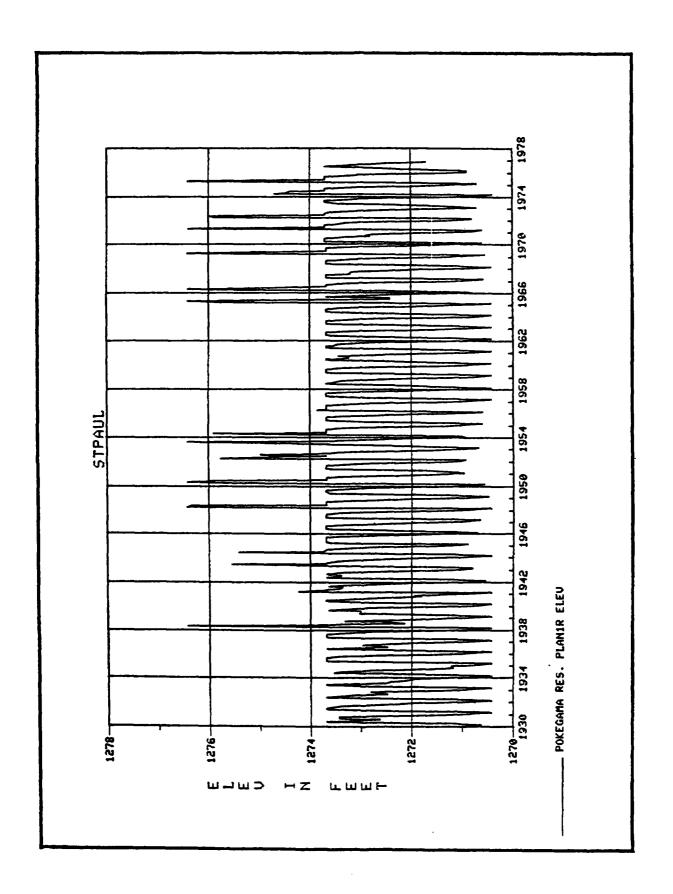
PLAN 1

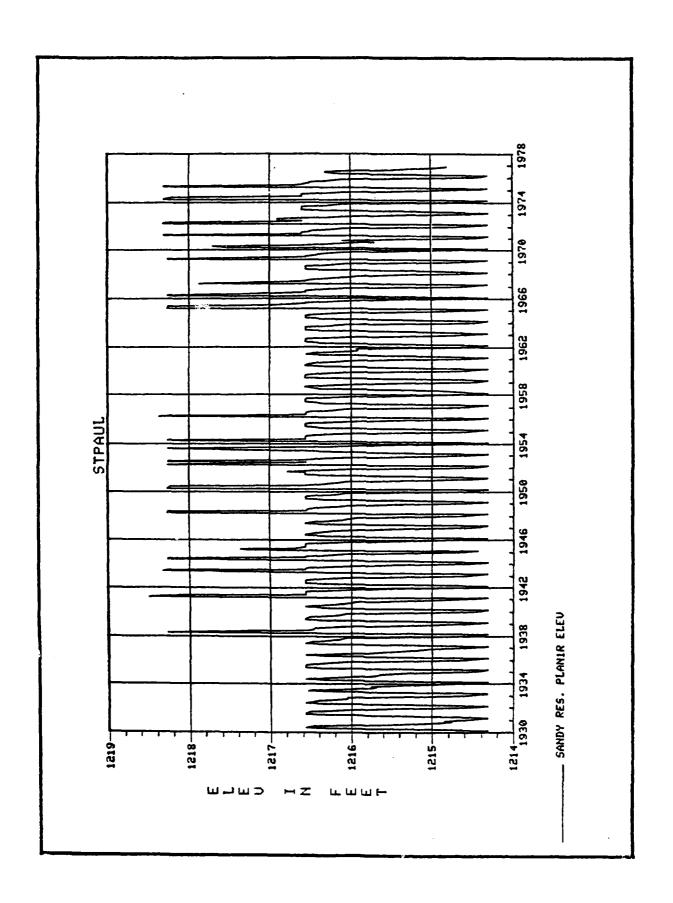
TIME SERIES DATA PLOTS
AND
ANNUAL MAX/MIN DATA TABLES

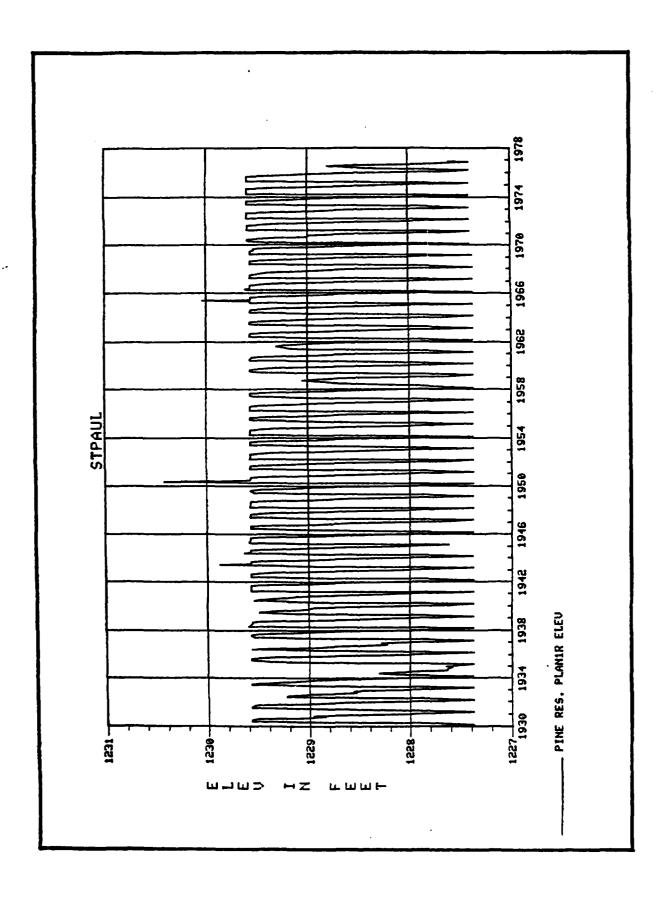
Note: The time series data plots in Appendices E through L are based on the complete period of record used in this study. The annual maximum and minimum data tables are only for the period of 1 May through 30 September for each year. The time series plot may have data values lower than those listed in the minimum data tables.

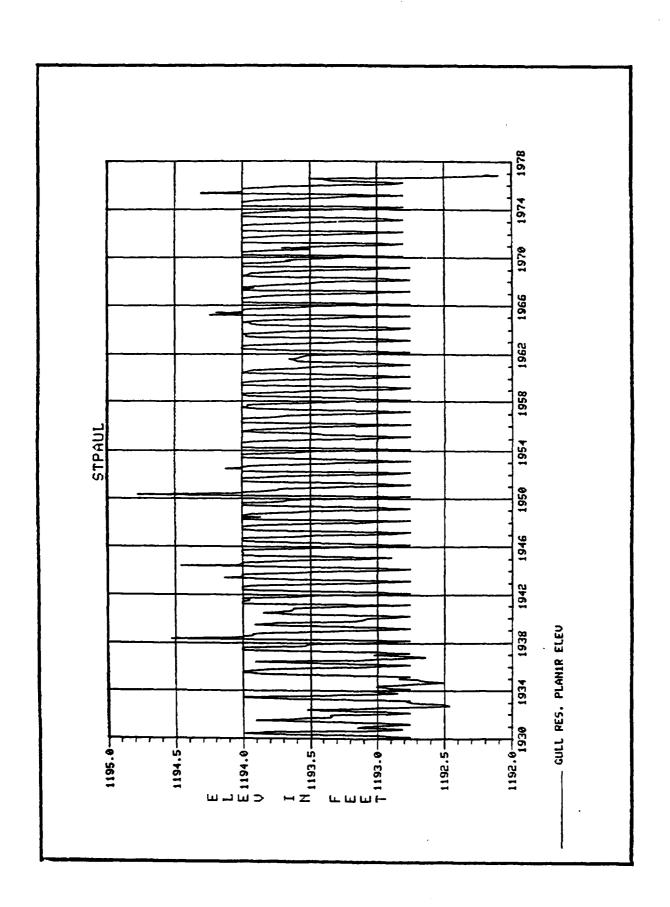


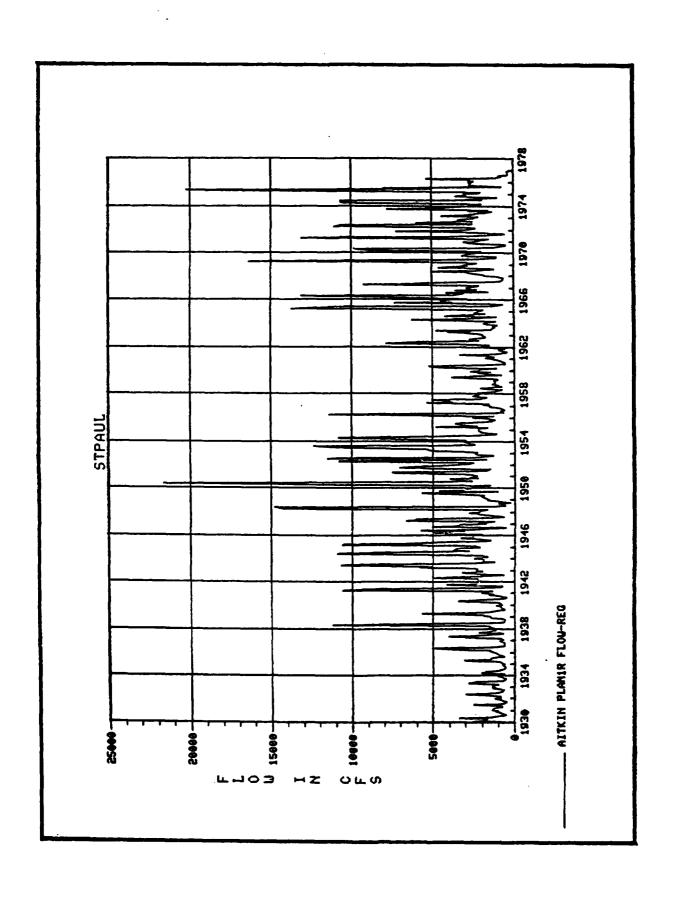


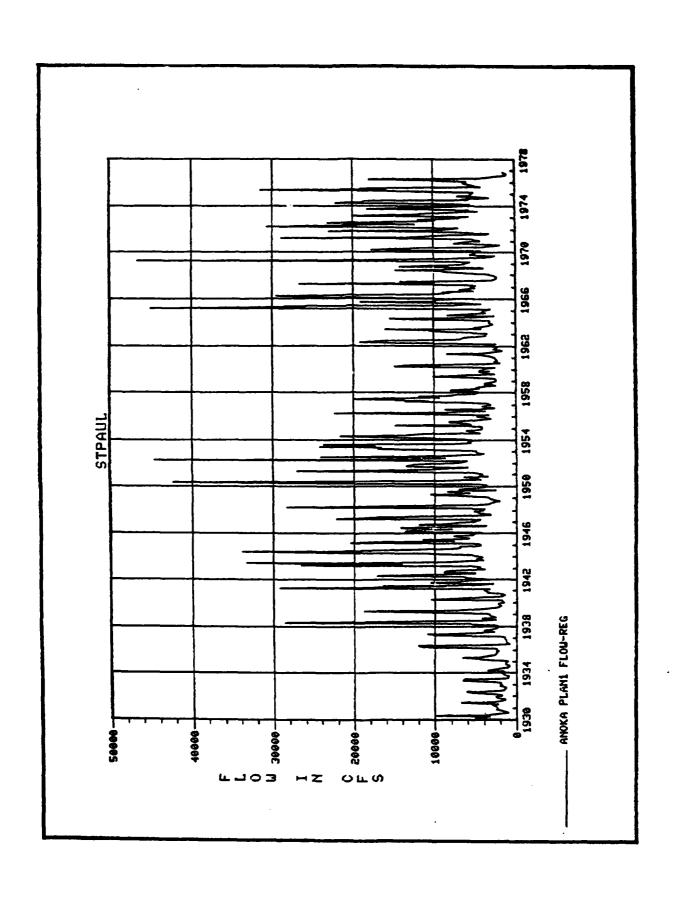












-PI OTTING	POSITIONS-	HINNT	RESERUNTR	FI FUATION
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-DI OTTING	POSTTIONS-	LITMAT	DECEDUATE	EI EUATTON
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6 -1 1930 1294.0 * 1 1950 1295.8 2.08 6 -1 1931 1293.3 * 2 1965 1295.3 4.17 6 -1 1932 1293.6 * 3 1943 1295.2 8.33 5 -1 1933 1293.8 * 4 1966 1295.2 8.33 5 -1 1933 1293.8 * 6 1944 1295.1 12.50 5 -1 1935 1293.8 * 8 1975 1295.0 14.58 8 -1 1937 1293.8 * 8 1975 1295.0 14.58 8 -1 1937 1293.9 * 10 1962 1294.9 18.75 6 -1 1938 1294.7 * 9 1954 1294.9 18.75 6 -1 1939 1293.9 * 10 1962 1294.9 20.83 6 -1 1930 1294.1 * 11 1952 1294.9 22.92 9 -1 1941 1294.8 * 13 1972 1294.9 22.92 9 -1 1942 1294.8 * 13 1972 1294.9 22.92 9 -1 1944 1295.1 * 15 1957 1294.8 31.33 7 -1 1944 1295.1 * 15 1957 1294.8 31.33 7 -1 1946 1294.8 * 18 1942 1294.8 33.33 7 -1 1948 1294.4 * 19 1946 1294.8 33.53 7 -1 1948 1294.4 * 19 1946 1294.8 37.50 6 -1 1950 1295.8 * 21 1945 1294.7 43.8 8 -1 1952 1294.9 * 20 1938 1294.7 43.75 6 -1 1955 1294.9 * 20 1938 1294.7 43.75 6 -1 1950 1295.8 * 21 1945 1294.6 47.92 8 -1 1951 1294.8 * 32 1967 1294.6 45.83 8 -1 1952 1294.9 * 23 1970 1294.6 45.83 8 -1 1953 1294.3 * 24 1955 1294.6 50.00 7 -1 1958 1294.9 * 25 1967 1294.6 45.83 7 -1 1958 1294.9 * 25 1967 1294.6 45.83 8 -1 1959 1294.9 * 25 1967 1294.6 50.00 7 -1 1959 1294.8 * 31 1963 1294.7 43.75 6 -1 1959 1294.9 * 25 1967 1294.6 50.00 7 -1 1959 1294.8 * 31 1963 1294.7 43.75 6 -1 1950 1295.8 * 21 1945 1294.9 58.33 7 -1 1964 1294.9 * 25 1967 1294.6 45.83 8 -1 1952 1294.9 * 25 1967 1294.6 45.83 8 -1 1959 1294.2 * 30 1964 1294.3 64.58 6 -1 1960 1294.4 * 31 1963 1294.7 43.65 6 -1 1960 1294.4 * 31 1963 1294.9 66.67 7 -1 1959 1294.6 * 26 1971 1294.5 54.17 6 -1 1964 1294.9 * 33 1940 1294.1 68.75 7 -1 1964 1294.9 * 35 1959 1294.2 66.67 7 -1 1964 1294.9 * 36 1933 1293.8 83.33 6 -1 1964 1294.9 * 37 1960 1294.8 83.53 7 -1 1964 1294.9 * 37 1960 1294.8 83.53 7 -1 1964 1294.9 * 37 1960 1294.8 83.53 7 -1 1964 1294.9 * 37 1960 1294.8 83.53 7 -1 1976 1294.6 * 39 1937 1293.8 83.33 6 -1 1970 1294.6 * 41 1933 1293.8 83.33 6 -1 1970 1294.5 * 41 1933 1293.8 83.33 6 -1 1970 1294.5 * 41 1933 1293.8 83.33 6 -1 1970 1294.5 * 41 1933 1293.8 89.58 7 -1 1971 1294.5 * 41 1948 1293.3 93.75 7 -1 1972 1294.9 *	* * * * * * * * * * * * * * * * * * * *	**************************************	* * -
-1 1930 1294.0 * 1 1950 1295.8 2.08 -1 1931 1293.3 * 2 1965 1295.3 4.17 -1 1932 1293.6 * 3 1943 1295.2 8.33 -1 1934 1293.1 * 5 1953 1295.1 10.42 -1 1935 1293.8 * 4 1966 1295.2 8.33 -1 1935 1293.8 * 6 1944 1295.1 12.50 -1 1937 1293.8 * 8 1975 1295.0 14.58 -1 1937 1293.8 * 8 1975 1295.0 16.67 -1 1938 1294.7 * 9 1954 1294.9 18.75 -1 1939 1293.9 * 10 1962 1294.9 20.83 -1 1940 1294.1 * 11 1952 1294.9 22.92 -1 1940 1294.4 * 12 1969 1294.9 27.08 -1 1941 1294.8 * 13 1972 1294.9 27.08 -1 1942 1294.8 * 13 1972 1294.9 27.08 -1 1943 1295.2 * 14 1949 1294.9 29.17 -1 1944 1295.1 * 15 1957 1294.8 31.35 -1 1945 1294.8 * 17 1947 1294.8 33.35 -1 1946 1294.8 * 17 1947 1294.8 33.55 -1 1948 1294.4 * 19 1946 1294.8 37.50 -1 1950 1295.8 * 20 1938 1294.7 41.67 -1 1950 1295.8 * 21 1945 1294.7 43.75 -1 1951 1294.8 * 19 1946 1294.8 39.58 -1 1951 1294.8 * 22 1967 1294.6 45.83 -1 1952 1294.9 * 20 1938 1294.7 44.67 -1 1953 1295.1 * 24 1955 1294.6 45.83 -1 1959 1294.9 * 23 1970 1294.6 45.83 -1 1950 1295.8 * 21 1945 1294.6 45.83 -1 1951 1294.8 * 22 1967 1294.6 45.83 -1 1952 1294.9 * 23 1970 1294.6 45.83 -1 1950 1295.8 * 23 1970 1294.6 45.83 -1 1951 1294.8 * 29 1948 1294.7 41.67 -1 1954 1294.9 * 25 1968 1294.5 52.08 -1 1955 1294.6 * 26 1971 1294.6 50.00 -1 1954 1294.9 * 27 1960 1294.4 56.25 -1 1955 1294.6 * 26 1971 1294.6 50.00 -1 1956 1294.9 * 33 1940 1294.1 68.75 -1 1958 1293.3 * 39 1964 1294.3 62.50 -1 1966 1294.3 * 35 1930 1294.0 72.92 -1 1968 1294.3 * 35 1930 1294.0 72.92 -1 1968 1294.5 * 39 1939 1293.8 87.50 -1 1968 1294.5 * 39 1939 1293.8 87.50 -1 1968 1294.5 * 39 1939 1293.8 87.50 -1 1971 1294.6 * 41 1935 1293.8 87.50 -1 1972 1294.6 * 41 1935 1293.8 87.50 -1 1973 1294.6 * 41 1935 1293.8 87.50 -1 1975 1294.6 * 41 1935 1293.8 87.50	9 6 7	666575866	мом
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1965 1295.3 4.17 1943 1295.2 8.33 1953 1295.1 10.42 1944 1295.1 12.50 1974 1295.0 14.58 1975 1295.0 16.67 1954 1294.9 18.75 1962 1294.9 20.83 1952 1294.9 27.08 1952 1294.9 27.08 1952 1294.9 27.08 1952 1294.9 27.08 1952 1294.9 27.08 1953 1294.9 27.08 1946 1294.8 33.33 1947 1294.8 33.33 1947 1294.8 37.50 1946 1294.8 37.50 1946 1294.8 37.50 1946 1294.8 37.50 1946 1294.8 37.50 1948 1294.7 43.67 1949 1294.6 47.92 1955 1294.6 47.92 1955 1294.6 47.92 1955 1294.6 50.00 1968 1294.5 52.08 1971 1294.4 58.33 1970 1294.6 47.92 1955 1294.6 50.00 1968 1294.5 52.08 1971 1294.6 47.92 1955 1294.6 50.00 1968 1294.7 43.62 1973 1294.0 70.83 1930 1294.0 70.83 1930 1294.0 72.92 1973 1294.0 70.83 1930 1294.0 72.92 1973 1293.8 81.25 1976 1293.8 87.50	44 45 46	10 11234567890123456789012345678901	RANK
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_D1	OTTING	POSITIONS-	IEECH	PECEDUATE	EL EUATTON
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* 9 -1 1931 1292.9 * 2 1936 1292.7 4.17 * * 9 -1 1932 1292.9 * 3 1933 1292.7 6.25 * * 9 -1 1934 1292.3 * 4 1930 1292.9 8.33 * * 9 -1 1934 1292.3 * 5 1931 1292.9 10.42 * * 9 -1 1935 1293.1 * 6 1932 1292.9 14.58 * * 9 -1 1936 1292.4 * 7 1976 1292.9 14.58 * * 9 -1 1936 1293.5 * 8 1958 1293.0 16.67 * * 9 -1 1938 1294.2 * 9 1935 1293.1 18.75 * * 9 -1 1938 1294.2 * 9 1935 1293.3 20.83 *	***	:				*	WATER		WEIRULL	2. 本 2. 中
	**********	99999999998988888	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	1931 19333 19334 19334 19336 1938 1941 1944 1944 1944 1944 1944 1944	1292.9 1292.9 1292.7 1292.3 12993.1 12993.5 12993.6 12993.8 12994.8 12994.9 12994.4 12994.4	**************************************	1933 1933 1933 1933 1933 1953 1953 1953	1292 1292 1292 12292 12293 12293 12293 12293 12293 12293 12293 12293 12293 12293 12293 12293	4.123320 8.4508 102.4.558 102.4.558 1124.6.753 1166.753 1	宋年中宋宋宋宋宋宋宋宋宋宋宋宋宋宋末 1

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* *	ğ -	1	1969	1294.3	*	:	40	1962	12	294	. 4	83.	33	*
*	9 -	1 :	1971	1294.2	*		42	1965	12	294	•6	87.	50	*
*	6 -		1972 1973	1294.7 1293.7			43 44	1972 1954		294 294		89. 91.		*
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k k	9 - 9 -		1975 1976	1294.7 1292.9	*		46 47	1974 1966	12	94 94	•8	95. 97.		*

-F	PLOT1	ING	POSITI	DNS- FOKE(AMA	RESERV *****	OIR ELE	VATION	******	*
**	HON	.EVE DAY	NIS AN YEAR	ELEV,FT.	*	RANK	WATER YEAR	********* RED EVENTS ELEV.FT.	WEIRULL PLOT FOS	***
**************************************	66666665965666575658565676666655555557			1273.7 1277.7 1277.7 1277.7 1277.7 1277.7 1277.7 1277.7 1277.7 1277.7 1277.7 1277.7 1277.7 1277.7		12345678901234567890123456789012345678901234	19535 19535 19544 19544 19544 1977 1977 1977 1977 1977 1977 1977 19	1276.4 1276.4 1276.4 1276.4 1276.4 1276.4 12776.3 12775.5 12775.5 12775.7 12775.7 12775.7 12773.3 1277		·宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋
* * *	5 5 7	-1 -1 -1	1974 1975 1976	1274.5 1276.4 1273.7	* * *	45 46 47	1976 1939 1934	1273.7 1273.6 1273.5	93.75 95.83 97.92	***

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19534 19554 19554 19554 19550 19560 11966 11967 11977 11977 11977 11977 11977 11977 11977 11977 11977	YEAR 1930 1931 1932 1933 1935 1935 1936 1937 1940 1941 1942 1944 1945 1946 1947 1948 1949 1950
12773.8 12773.8 12773.8 12773.8 12773.8 12772.8 12772.8 12772.8 12772.8 12772.8 12772.8 12772.8 12772.7 12773.7 12773.7 12773.7 12773.7 12773.8 12773.	1272.6 1272.5 1272.5 1272.4 1272.6 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.7 1272.7
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195440012347B2711206958644752199693647B271120695958644552	19389 19359 195735 19735 19735 19735 19735 19735 19747 19744 1975 19747 1975
1272.8 1272.8 1272.8 12772.8 12772.8 12772.8 12772.8 12772.8 12772.8 12772.7 12773.5 12773.7 12773.7 12773.7 12773.7	ELEV.FT. 1272.1 1272.1 1272.2 1272.3 1272.4 1272.5 1272.5 1272.5 1272.5 1272.6 1272.6 1272.8 1272.8 1272.8 1272.8 1272.8
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*	• • • •	EVE	INTS AN	ALYZED	·*·	• • • • • •	ORDI WATER	ERED EVENTS	
*	MON	DAY	YEAR	ELEV,FT.	*	RANK	YEAR	ELEV,FT.	WEIRULL * PLOT POS *
****	6	-1 -1 -1 -1	1930 1931 1932 1933	1216.6 1216.6 1216.6 1216.5 1216.6	-** **	1 2 3 4	1943 1938 1944 1948	1218.3 1218.3 1218.3 1218.3	2.08 * 4.17 * 6.25 * 8.33 *
****	6	-1 -1 -1 -1	1934 1935 1936 1937 1938	1216.6 1216.6	****	5 6 7 8 9	1950 1952 1953 1954	1218.3 1218.3 1218.3 1218.3 1218.3	10.42 * 12.50 * 14.58 * 16.67 * 18.75 *
****	66656656	-1 -1 -1 -1 -1	1738 1939 1940 1941 1942	1216.6 1218.3 1216.6 1216.6 1218.1 1216.6	****	10 11 12 13	1956 1965 1966 1969 1971	1218.3 1218.3 1218.3 1218.3 1218.3	20.83 * 22.92 * 25.00 * 27.08 *
***	6 6 5	-1 -1 -1 -1	1943 1944 1945 1946	1218.3 1218.3 1216.7 1216.6	* * * *	14 15 16 17	1972 1974 1975 1941	1218.3 1218.3 1218.3 1218.1 1217.6	29.17 * 31.25 * 33.33 * 35.42 *
****	6656597856568666	-1 -1 -1 -1 -1	1947 1948 1949 1950 1951	1216.6 1218.3 1216.6 1218.3 1216.8	****	1890122345	1970 1967 1951 1945 1949	1217.6 1217.5 1216.8 1216.7 1216.6	37.50 * 39.58 * 41.67 * 43.75 * 45.83 *
***	7 8 5 6	-1 -1 -1 -1	1952 1953 1954 1955	1218.3 1218.3 1218.3 1216.6	* * * *	26	1737 1935 1936 1937 1955 1931	1216.6 1216.6 1216.6	47.92 * 50.00 * 52.08 * 54.17 *
****	5 6 8 6	-1 -1 -1 -1	1956 1957 1958 1959	1218.3 1216.6 1216.6 1216.6 1216.6	*****	27 28 29 30 31 32 33	1957 1958 1959	1216.6 1216.6 1216.6	56.25 * 58.33 * 60.42 * 62.50 *
****	6	-1 -1 -1 -1	1960 1961 1962 1963 1964	1216.5 1216.6 1216.6 1216.6	*	34	1960 1962 1963 1964 1939	1216.6 1216.6 1216.6 1216.6 1216.6	64.58 * 66.67 * 70.83 * 72.92 *
***	55556	-1 -1 -1 -1	1965 1966 1967 1968	1218.3 1218.3 1217.5 1216.6	***	35 36 37 38 39 40	1940 1968 1946 1947	1216.6 1216.6 1216.6	75.00 * 77.08 * 79.17 *
*****	<i>ᲑᲝᲡᲡᲑᲡᲡᲡᲡᲡᲑᲡᲡ</i>	-1 -1 -1 -1 -1	1969 1970 1971 1972 1973 1974	1217.6 1218.3 1218.3 1216.6	*****	41 42 43 44 45	1942 1930 1973 1932 1934 1961	1216.6 1216.6 1216.6 1216.6 1216.6 1216.6 1216.5	85.42 * 87.50 * 89.58 * 91.67 * 93.75 *
*	5	-1	1975	1218.3 1218.3	*	46	1933	1216.5	95.83 ¥

-PI OTTING	POSITIONS-	YANDY	RESERVATE	FI FUATION

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65955559555879599975799	959595995965556599955	****
	-11 -11 -11 -11 -11 -11 -11 -11 -11 -11	****
195556 195567 195567 19589 19661 19667 19775 19775 19775 19775 19775 19775 19775 19775	1930 1931 1932 1933 1934 1935 1937 1939 1941 1944 1944 1944 1944 1946 1951 1952	*****
1216.35 1216.55 1216.55 12115.55 12115.65 12115.66 12115.66 12116 12116.66 12116.66 12116.66 12116.66 12116.66 12116.66 12116.66	1215.4 1214.9 1216.6 1215.7 1216.3 1216.3 1216.3 1216.1 1216.3 1216.6 1216.6 1216.6 1216.3 1216.6 1216.3 1216.4 1216.3 1216.3	ONS- SAND ******** !ALYZED ELEV,FT.
***************************************		****
456789012345678901234567**	1234567890112345678901223	5ERVU11 ******* RANK
199634386359885119957661 19964386359885119957661 199654386359885119957661 199654461 199654461	1931 1958 1936 1936 1936 1933 1970 1934 1961 1947 1940 1947 1944 1953 1955 1957	
12166.3333333333333333333333333333333333	1214.9 1215.4 1215.6 1215.6 1215.6 1215.7 1215.9 1216.2 1216.2 1216.3 1216.3 1216.3 1216.3 1216.3	11UN ********** ERED EVENTS ELEV,FT.
0087532087532087532087532 00875345080.001232087532087532 0087532087532087532087532 0087532087532087532 0087532087532087532 0087532087532087532 0087532087532087532 0087532087532087532 0087532087532087532	2.08 4.17 6.23 10.50 14.58 112.58 112.58 112.58 112.58 112.58 112.58 112.58 112.58 112.58 113.59 113	******** WEIBULL PLOT POS
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-PI OTTING	POSITIONS-	PINE	RESERVATE	FI FUATION

-PLOTTING	*********	ION ******** *********
*EVENTS ANALYZED * * MON DAY YEAR ELEV,FT.	* ORDE * WATER * RANK YEAR	ERED EVENTSWEIRULL ELEV,FT. PLOT POS
** HON DAY YEAR ELEV, FT. * HON DAY YEAR ELEV, FT. * 6 -1 1930 1229.6 * 7 -1 1931 1229.6 * 6 -1 1932 1229.6 * 6 -1 1933 1229.6 * 6 -1 1935 1229.6 * 7 -1 1935 1229.6 * 7 -1 1938 1229.6 * 7 -1 1938 1229.6 * 7 -1 1939 1229.6 * 5 -1 1940 1229.5 * 6 -1 1940 1229.5 * 6 -1 1941 1229.6 * 6 -1 1942 1229.6 * 7 -1 1944 1229.6 * 6 -1 1944 1229.6 * 6 -1 1945 1229.6 * 7 -1 1946 1229.6 * 7 -1 1947 1229.6 * 7 -1 1950 1230.4 * 6 -1 1951 1229.6 * 7 -1 1952 1229.6 * 7 -1 1953 1229.6 * 7 -1 1955 1229.6 * 7 -1 1955 1229.6 * 7 -1 1957 1229.6 * 7 -1 1958 1229.6 * 7 -1 1959 1229.6 * 7 -1 1959 1229.6 * 7 -1 1959 1229.6 * 7 -1 1959 1229.6 * 7 -1 1959 1229.6 * 7 -1 1959 1229.6 * 7 -1 1959 1229.6 * 7 -1 1959 1229.6	**************************************	ERED EVENTS
6 -1 1962 1229.6 7 -1 1963 1229.6 6 -1 1964 1229.6 6 -1 1965 1230.0 5 -1 1966 1229.6	k 32 1968 k 33 1969	1227+0 00+/3
5 -1 1969 1229.6 5 -1 1970 1229.6 5 -1 1971 1229.6 5 -1 1972 1229.6 7 -1 1973 1229.6	7 1736 4 40 1936 4 41 1940 4 42 1939 4 43 1961 4 44 1932 4 45 1958 4 46 1976 4 47 1934	1229.6 83.33 1229.5 85.42 1229.5 87.50 1229.3 89.58 1229.2 91.67 1228.9 93.75 1228.8 95.83 1228.8 97.92

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1956 1957 1958 1959 1960 1964 1965 1966 1971 1977 1977 19776 *****	YEAR 1930 1931 1733 1932 1932 1933 1938 1938 1938 1940 1941 1942 1944 1945 1946 1946 1947 1953 1955 1955
1229.5 1228.9 1228.0 1228.6 1228.9 1228.9 1228.9 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6	ELEV, FT. 1228.9 1228.6 1228.7 1228.7 1228.7 1228.7 1228.7 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.6
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789012345678901234567 442345678901234567 **********	RANK 12345678901234567890123456
19448 19468 19679 19679 1975 1975 1977 1977 1977 1977 1977 19	WATER 1934 19531 19531 19531 19535 19535 19645 1975 1975 1975 1975 1975 1975 1975 197
1228.9 1228.9 1228.9 1228.9 12229.4 12229.5 12229.6 12229.6 12229.6 12229.6 12229.6 12229.6 12229.6	ELEV.FT. 1227.6 1228.6 1228.6 1228.6 1228.7 1228.7 1228.7 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9
587532 602.587 580.587 602.587 602.587 602.587 603.7000 603.7000 603	PLOT POS 2.08 4.125 10.450 8.322 10.450
***************	************************

ON DAY YEAR ELEV.FT. * RANK YEAR ELEV.FT. PLOT POS 6 -1 1930 1194.0 * 1 1950 1194.8 4.17 6 -1 1932 1193.5 * 3 1944 1194.4 6.25 6 -1 1933 1194.0 * 4 1975 1194.2 10.42 7 -1 1931 1193.9 * 2 1938 1194.2 10.42 6 -1 1933 1194.0 * 4 1975 1194.2 10.42 7 -1 1935 1194.0 * 6 1943 1194.1 12.50 8 -1 1936 1194.0 * 8 1937 1194.1 14.58 6 -1 1937 1194.0 * 8 1937 1194.1 14.58 6 -1 1938 1194.5 * 9 1941 1194.0 18.75 7 -1 1938 1194.0 * 12 1942 1194.0 22.92 1 1941 1194.0 * 12 1945 1194.0 22.92 6 -1 1941 1194.0 * 12 1945 1194.0 22.92 6 -1 1944 1194.4 * 14 194.7 1194.0 22.08 6 -1 1945 1194.0 * 12 1945 1194.0 22.92 7 -1 1941 1194.0 * 13 1944.0 22.02 6 -1 1943 1194.1 * 14 194.7 1194.0 22.03 6 -1 1944 1194.4 * 15 1948 1194.0 22.02 6 -1 1945 1194.0 * 16 1949 1194.0 33.33 7 -1 1946 1194.0 * 16 1949 1194.0 33.33 7 -1 1946 1194.0 * 17 1951 1194.0 33.33 7 -1 1948 1194.0 * 20 1955 1194.0 33.58 6 -1 1949 1194.0 * 21 1955 1194.0 33.58 6 -1 1949 1194.0 * 21 1956 1194.0 33.58 6 -1 1949 1194.0 * 21 1955 1194.0 33.58 6 -1 1955 1194.0 * 22 1957 1194.0 45.83 7 -1 1958 1194.0 * 23 1958 1194.0 33.55 6 -1 1959 1194.0 * 24 1956 1194.0 52.08 8 -1 1955 1194.0 * 25 1960 1194.0 52.08 8 -1 1955 1194.0 * 26 1956 1194.0 52.08 8 -1 1957 1194.0 * 27 1963 1194.0 52.08 8 -1 1958 1194.0 * 27 1963 1194.0 52.08 8 -1 1958 1194.0 * 27 1963 1194.0 52.08 8 -1 1958 1194.0 * 27 1963 1194.0 52.08 8 -1 1958 1194.0 * 33 1958 1194.0 52.08 9 -1 1956 1194.0 * 33 1970 1194.0 66.55 -1 1966 1194.0 * 31 1968 1194.0 66.55 -1 1966 1194.0 * 33 1970 1194.0 66.55 -1 1966 1194.0 * 33 1970 1194.0 66.55 -1 1966 1194.0 * 33 1970 1194.0 66.55 -1 1966 1194.0 * 39 1933 1194.0 66.55 -1 1968 1194.0 * 39 1933 1194.0 66.57 -1 1968 1194.0 * 31 1933.5 99 1934.0 66.57 -1 1975 1194.0 * 31 1933.5 99 1934.0 66.55 -1 1976 1194.0 * 31 1933.5 99 1934.0 66.55 -1 1977 1194.0 * 39 1933 11933.0 97.59 5 -1 1975 1194.0 * 41 1933 11933.0 97.59 5 -1 1975 1194.0 * 41 1933 11933.0 97.59 5 -1 1975 1194.0 * 41 1933.0 97.59 5 -1 1975 1194.0 * 41 1933.0 97.59 5 -1 1975 1194	**************************************	宋宋本本年本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本
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	-1	DAY
1959 1960 1961 1963 1964 1965 1966 1967 1970 1971 1972 1973 1974 1975 1976	1930 1931 1932 1933 1935 1935 1935 1935 1935 1941 1944 1944 1944 1949 1950 1953 1955 1955 1955 1955 1955 1955 1955	YEAR
1193.6 1193.6 1193.6 1193.5 1193.5 1193.6 1193.6 1193.6 1193.6 1193.6 1194.0 1193.6 1194.6 1193.6 1194.8 1193.8	1193.0 1192.1 1192.1 1192.5 1192.5 1192.6 1192.6 1193.6 11	ELEV,FT.
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1951 1973 1950 1967 1948 1956 1941 1971 1965 1941 1971 1965 1975 1975	1934 1976 19732 19732 19733 19733 19733 19733 19735 19735 19744 1974 19744 19744 19744 19744 19744 19744 19744 19744 19744	
1193.6 1193.7 1193.9 1193.9 1193.9 1193.9 1193.9 1193.9 1194.0 1194.0 1194.0 1194.0	1192.6 1192.6 1192.6 1192.7 11193.1 11193.4 11193.5 11193.5 11193.5 111933.5 111933.6 11933.6 11933.6 11933.6 11933.6 11933.6 11933.6 11933.6 11933	ELEV,FT.
62.58 508 64.65 65.73 775.08 775.08 775.08 775.32 777.12 771.32 857.67 795.97	2.08 0.08 0.08 0.08 0.09 0.08 0.09 0.09 0	WEIRULL PLOT POS

		1 1 1
42655565454645440654	5655455554545663645755785	HON
		DAY
1956 1957 1959 1959 1961 1963 19645 19667 1971 1972 1973 1975 1976	1930 1931 1933 1933 1933 1933 1933 1933	YEAR
11326. 5296. 2182. 3794. 5193. 3246. 7793. 4693. 6208. 13688. 13118. 9203. 5037. 16309. 9777. 13048. 1047. 7763. 10633. 20217. ************************************	10641. 10881. 10531.	FLOW, CFS
789012345678901234567 222333333333334444444 444447	12345678901234567890123456	* RANK
1939 1949 1975 1956 1968 1968 1975 1975 1975 1975 1975 1975 1975 1975	1955 196485 196485 19656 19753 1975 1975 1975 1975 1976 1976 1976 1976 1976 1976 1976 1976	WATER YEAR
5648. 56795. 52995. 52993. 51037. 50033. 46931. 46931. 33246. 33246. 297574. 2182. 1984.	21595. 20217. 16309. 14723. 13688. 13048. 13048. 112249. 11428. 11350. 11047. 10881. 10760. 10643. 10543. 10531. 9777. 9203. 7793. 7793. 7793. 77442. 6588. 5688.	FLOW, CFS
532087532087532087532087532087532087532087532087532087532208752087520875208752087520875208752087	2.017532 0.017532 0.017532 0.	WEIRULL PLOT POS

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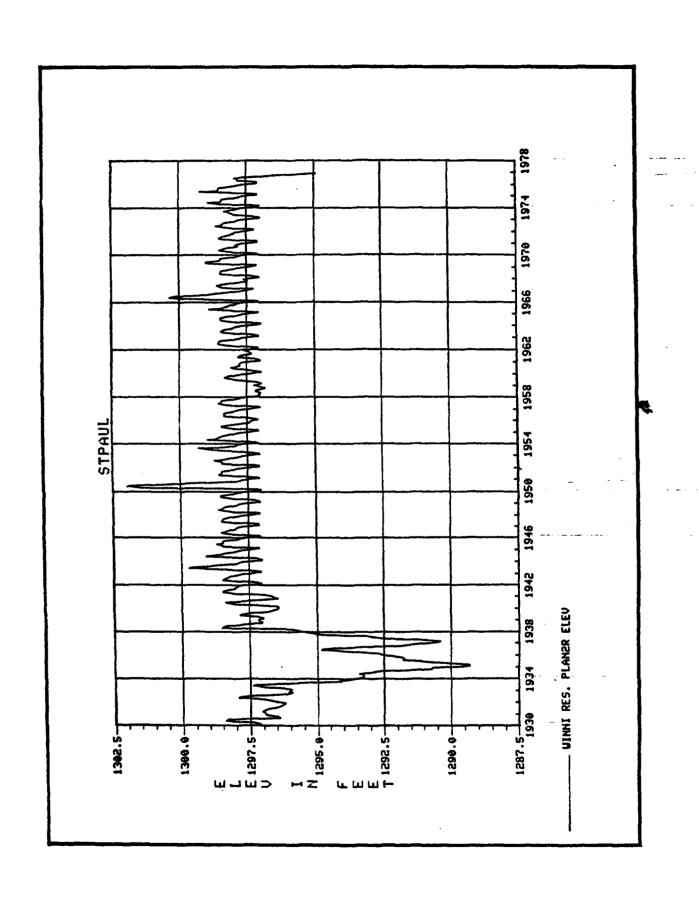
********	*****	*********** !ALYZED	*****	*****	********* ERED EVENTS	*****
*	KIS HI		*·····	WATER	EVED EACKIS	WEIBULL
* MON DAY	YEAR	FLOW, CFS	* RANK	YEAR	FLOW, CFS	PLOT POS
¥ 8 -1	1930	1052.	* 1	1934	810.	2.08
* 9 -1	1931	1347.	* 1 * 2 * 3	1936	827.	4.17
* 10 -1 * 9 -1	1932 1933	1263.	* 3	1933	972.	6.25
* 9 -1 * 8 -1 * 1 -1 * 7 -1 * 2 -1 * 1 -1	1934	972. 810.	* 5	1935 1976	1030. 1048.	8.33 1 10.42 1
* i -i	1935	1030.	* 6	1930	1052.	12.50
* 7 -1	1936		* 7	1932	1263.	14.58
* 2 -1 * 1 -1	1937 1938	1373. 2061.	* 8	1931	1347.	16.67
* 10 -1	1939	1901.	* 9 * 10	1940 1937	1371. 1373.	18.75 1 20.83
¥ 9 -1	1940	1371.	* 11	1961	1642.	22.92
* 8 -1	1941	2827.	* 12 * 13	1970	1858.	22.92 25.00
* 1 -1	1942			1939	1901.	27.08 1
¥ 9 -1	1943		* 14	1960	1977.	29.17
* 1 -1 * 1 -1	1944 1945	:= -:-:	* 15 * 16	1938 1948	2061. 2067.	31.25 1 33.33 1
1 9 -1	1946		* 17	1967	2219.	35.42
* 8 -1	1947	3074.	* <u>18</u>	1959	2398.	37.50 1
* 10 -1	1948	2067	* 19	1962	2449.	39.58
* 9 -1 * 11 -1	1949 1950		* 20 * 21	1969 1958	2486. 2530.	41.67 43.75
¥ 1 −1	1951	4115.	x 22	1949	2560.	45.83
† 11 −1	1952	3945.	* 23	1964	2571.	47.92 *
* 1 -1 * 12 -1	1953	4831.	* 24	1956	2584.	50.00
* <u>12</u> -1 * 11 -1	1954 1955		* 24 * 25 * 26	1963 1941	2822. 2827.	52.08 * 54.17 *
¥ 10 -1	1956	2584.	* 2 7	1957	3060.	56.25
<u> 1 -1 </u>	1957	3060.	* 28	1947	3074.	58.33 *
8 -1 2 -1 8 8 -1	1958		* 29	1965	3090.	60.42 *
* 2 -1 * 8 -1	1959 1960	77.2	* 30 * 31	1955 1971	3120. 3126.	62.50 * 64.58 *
8 -1	1761	7 1 1 2 1	* 32	1968	3170.	66.67
* 3 -1	1962		¥ 33	1974	3204.	68.75
<u> 11 -i </u>	1963	2822.	* 34	1950	3466.	70.83 *
8 -1 3 -1 12 -1 11 -1	1964	2571.	* 35	1942	3568.	72.92
3 -1 12 -1	1965 1966	3090. 4976.	* 36 * 37	1946 1952	3625. 3945.	75.00 * 77.08 *
i iī -i	1967	2219.	¥ 38	1943	4007.	79.17
k 1 -1	1968	3190.	* 39	1951	4115.	81.25 *
k 9 -1	1969		* 40	1954	4178.	82.33
9 -1 9 -1 1 9 -1 1 12 -1 7 -1 1 9 -1	1970 1971	1858. 3 3126.	* 41 * 42	1975 1945	4235. 4275.	85.42 * 87.50 *
12 -1	1972	6905.	* 43	1944	4349.	89.58 *
7 -1	1973	4609.	K 44	1973	4609.	91.67 *
9 -1	1974	3204	45	1953	4831.	93.75 *
8 -1 7 -1	1975 1976	4235. 1 1048.	¥ 46 ≭ 47	1966 1972	4976. 6905.	95.83 * 97.92 *
	17/0 *****	*******	- 7/ >+++++++	17/ <i>&</i> 	97VJ+	7/+7 <u>2</u>

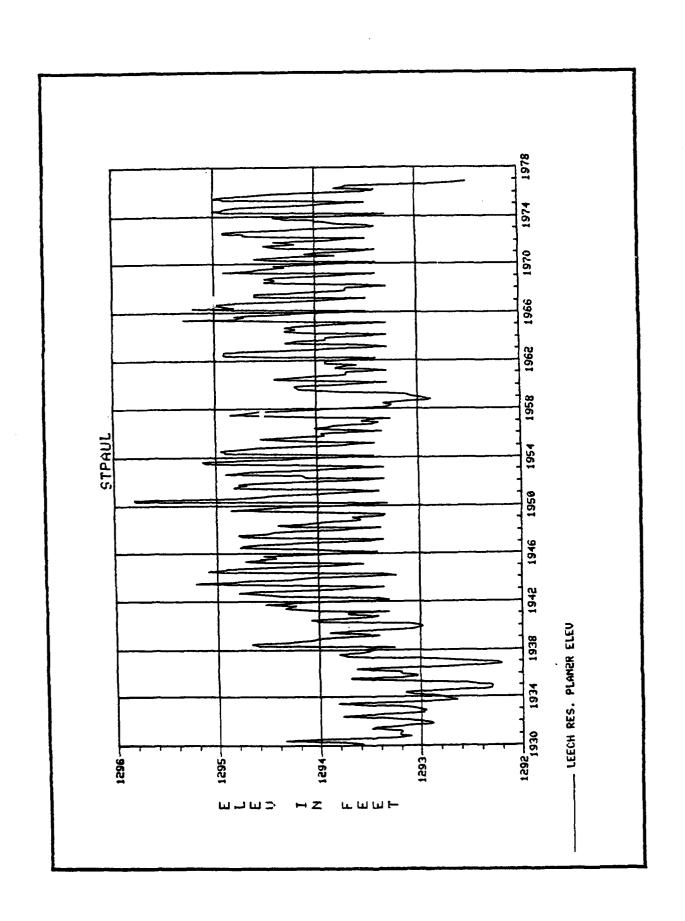
APPENDIX F

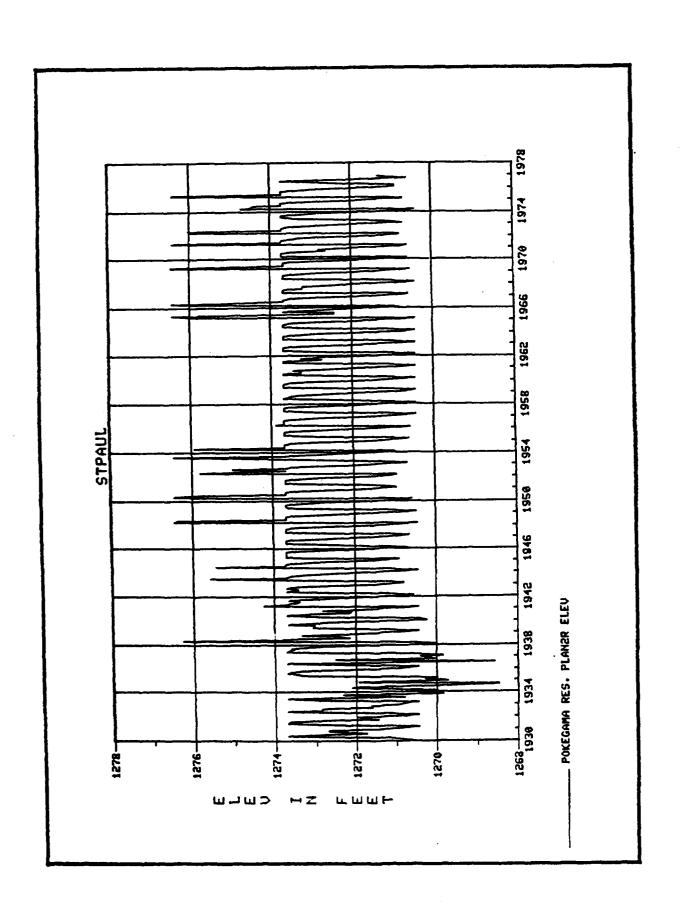
PLAN 2

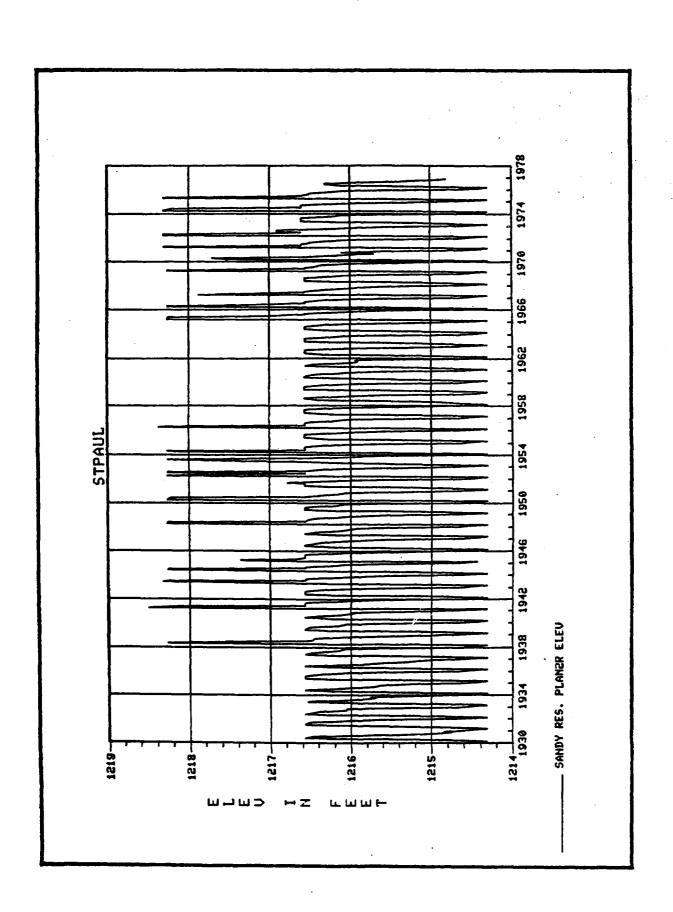
TIME SERIES DATA PLOTS
AND
ANNUAL MAX/MIN DATA TABLES

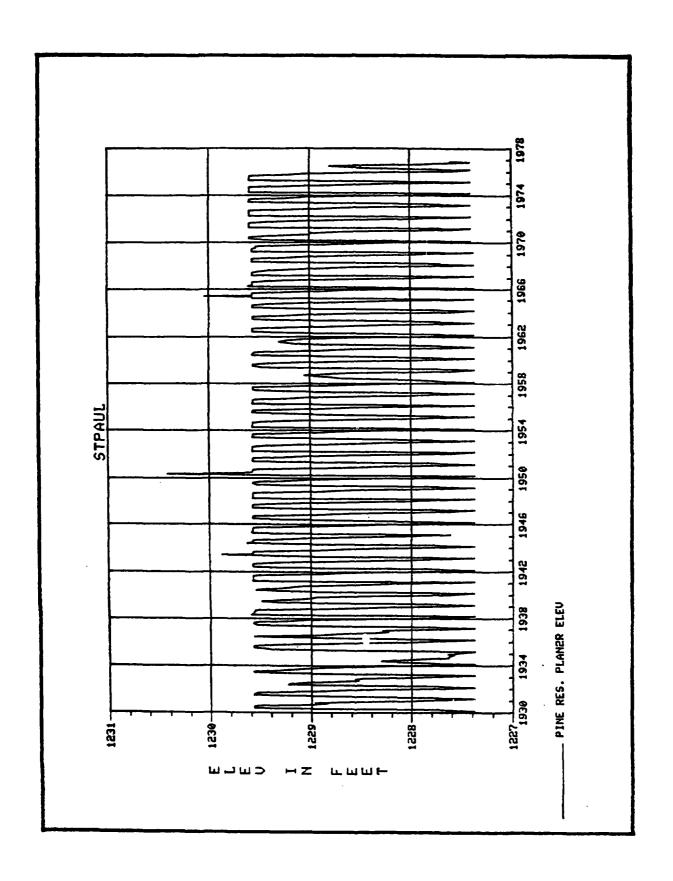
Note: The time series data plots in Appendices E through L are based on the complete period of record used in this study. The annual maximum and minimum data tables are only for the period of 1 May through 30 September for each year. The time series plot may have data values lower than those listed in the minimum data tables.

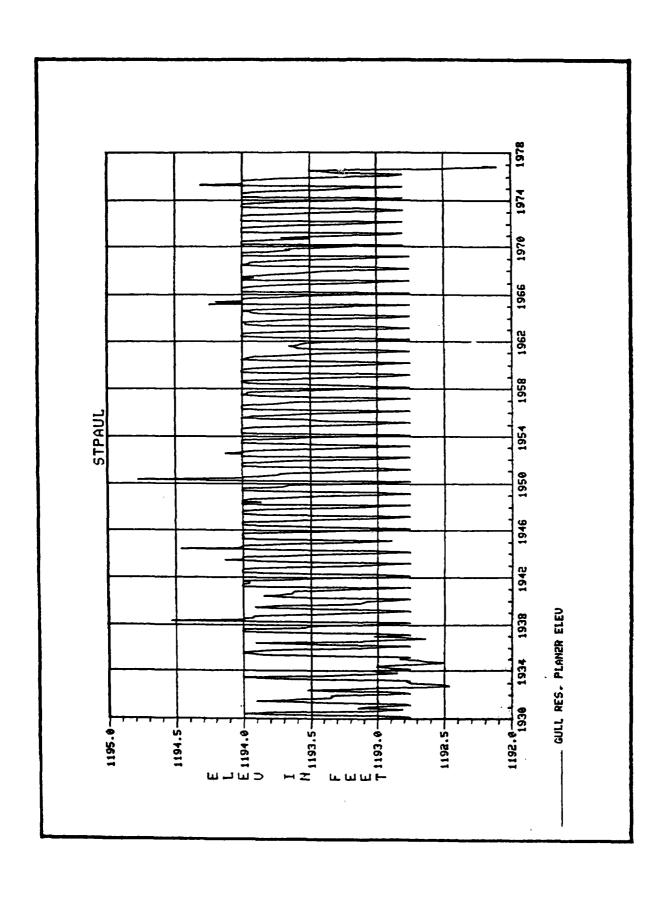


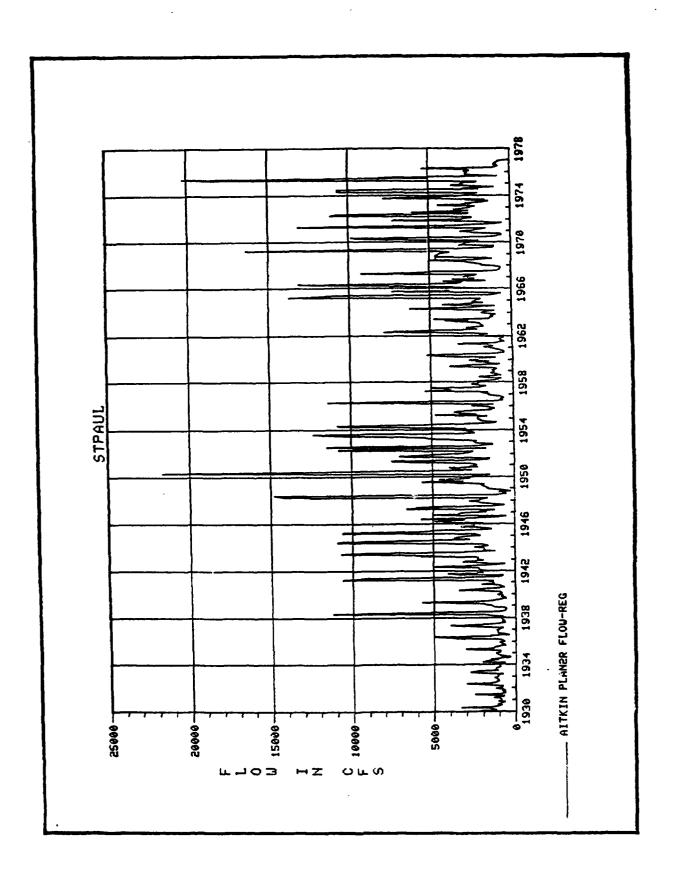






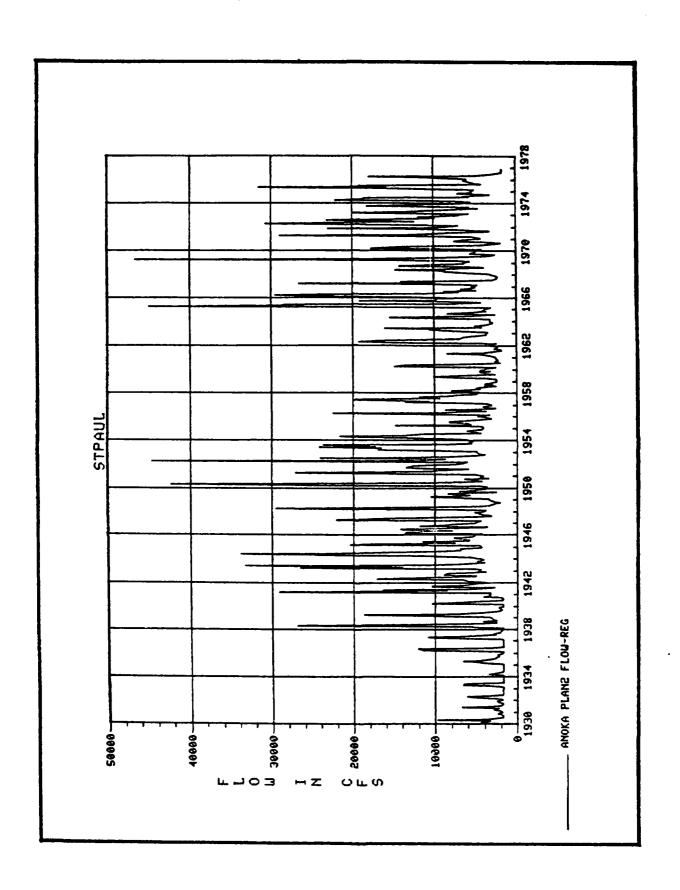






COMPUTER OPERATIONS STUDY OF RESERVOIR OPERATIONS FOR SIX MISSISSIPPI RIVER HEADWATERS DAMS APPENDIX A(U) ANDERSON-NICHOLS AND CO INC PALO ALTO CA JUN 82 DACU37-81-C-0027 F/G 13/2 AD-A147 015 2/3 UNCLASSIFIED NL





-PLOTTING	POSITIONS-	UTNNT	RESERVOTE	FI FUATTON

## SPANALYZED. ************************************	*******	水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水水
## WATER WEIBULL 1970 1302.0 2.08 1931 1297.0 2.18 1297.0 2.1966 1300.4 4.17 1932 1297.4 4.1953 1299.7 6.25 11933 1297.4 4.1953 1299.7 6.25 11934 1293.4 5.1975 1299.2 10.42 11935 1291.8 6.1975 1299.2 10.42 11936 1294.8 7.1954 1299.0 14.58 11937 1293.8 8.8 1969 1299.0 16.67 11938 1298.5 8.7 1937 1298.5 8.7 1938 1298.7 20.83 11937 1298.7 20.83 11940 1298.3 11940 1298.3 11950 1298.7 20.92 11940 1298.3 11950 1298.7 20.92 11940 1298.4 1396 1298.6 27.08 11940 1298.7 2198.6 27.08 11940 1298.7 2198.6 27.08 11940 1298.7 2198.6 27.08 11940 1298.7 2198.6 27.08 11940 1298.7 2198.6 27.08 11944 1298.7 2198.6 27.08 11940 1298.7 2198.6 27.08 2198.6 27.08 2198.6 27.08 2198.6 27.08 2198.6 27.08	6669655	6566686957766666666886688566679767766666
YEAR ELEV,FT. * RANK YEAR ELEV,FT. PLOT POID 1930 1298.4 * 1 1950 1302.0 2.08 1931 1297.0 * 2 1966 1300.4 4.17 1932 1297.4 * 4 1953 1299.2 8.33 1934 1293.4 * 5 1975 1299.2 10.42 1935 1291.8 * 6 1944 1299.0 14.58 1935 1291.8 * 7 1954 1299.0 14.58 1937 1293.8 * 8 1969 1299.0 14.58 1937 1293.8 * 8 1969 1299.0 14.58 1937 1293.8 * 10 1945 1298.9 18.75 1938 1298.5 * 10 1945 1298.9 18.75 1939 1297.8 * 10 1945 1298.7 18.75 1940 1298.3 * 11 1952 1298.7 22.08	-1 -1 -1 -1 -1	-1
# WATER WEIRULL PLOT POS 1298.4 * 1	1972 1973 1974 1975 1976	- 01234567890123456789012345678901234567 - 3333333333334444444444955555555678901234567 - 111111111111111111111111111111111111
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¥.	9	-1	1930	1293.3	*	1	1934	1292.3	2.08	*
*	9	-ī	1931	1293.1	*	Ž	1936	1292.4	4.17	*
*	9	-1	1932	1293.1	*	3	1933	1292.8	6.25	*
*	9	-1	1933	1292.8	*	4 5	1976	1292.9	8.33	Ż.
*	9	-1	1934	1292.3	*	5	1958	1293.0	10.42	*
*	9 9 5 9	-1	1935	1293.0	*	6	1935	1293.0	12.50	*
¥	9	-1	1936	1292.4	*	7	1932	1293.1	14.58	*
*	5	-1	1937	1293.5	*	8 9	1931	1293.1	16.67	*
¥	9	-1	1938	1294.2	*		1930	1293.3	18.75	×
×	9	-1	1939	1293.3	*	10	1939	1293.3	20.83	*
¥	9	-1	1940	1293.6	*	11	1959	1293.4	22.92	×
*	8	-1	1941	1294.2	*	12	1937	1293.5	25.00	*
×	5	-1	1942	1293.8	*	13	1949	1293.5	27.08	*.
¥	5	-1	1943	1294.2	¥	14	1940	1293.6	29.17	*
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Ŧ	Ş		1946	1294.1	¥	17	1973	1293.7	35.42	¥
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45.008 47.008 55.44.08 55.45.32 66.46.78 67.75.79 67.77.79	2.08 4.17 6.25 8.42 12.50 14.58 16.67 180.82 25.00 27.08 29.17 31.23 35.42 37.58 41.67 43.75	******** WEIRULL PLOT POS
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52.08 54.17 58.32 58.32 60.58 60.58 60.58 60.58 60.58 60.58 60.82 777 779.12 835.58 87.53 87.53 87.53 87.53 87.53 87.53 87.53 87.53 87.53 87.53 87.53	2.08 4.17 68.125 10.53 10.558 10.675 12.558 16.675 12.90 14.675 12.90 14.675 12.90 14.675 13.90 14.	******** WEIRULL PLOT POS
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* 6 -1 1949 1229.6 * 18 1951 1229.6 39.58 * 7 -1 1948 1229.6 * 20 1953 1229.6 41.67 * 5 -1 1950 1230.4 * 21 1954 1229.6 43.75 * 6 -1 1951 1229.6 * 22 1955 1229.6 45.83 * 5 -1 1952 1229.6 * 23 1956 1229.6 47.92 * 6 -1 1953 1229.6 * 24 1957 1229.6 47.92 * 6 -1 1953 1229.6 * 25 1959 1229.6 50.00 * 5 -1 1954 1229.6 50.00 * 5 -1 1955 1229.6 * 25 1959 1229.6 50.00 * 7 -1 1955 1229.6 * 25 1959 1229.6 52.08 * 7 -1 1955 1229.6 * 26 1960 1229.6 54.17 * 5 -1 1956 1229.6 * 27 1962 1229.6 56.25 * 7 -1 1957 1229.6 * 28 1963 1229.6 56.25 * 7 -1 1958 1228.9 * 29 1964 1229.6 60.42 * 7 -1 1959 1229.6 * 30 1931 1229.6 60.42 * 7 -1 1959 1229.6 * 30 1931 1229.6 64.58	**************************************	****** YEAR 193123 193335 19335 19337 19337 1938 19401 19423	DNS- PINE ********** ALYZEI ELEV,FT. 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6	**** *** *** *** *** ** ** **	**************************************	ELEU, FT. 1230.4 1230.0 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6	WEIRULL FLOT POS 2.08 4.17 6.23 10.42 12.55 8.42 12.50 14.57 18.75 20.83 22.92 25.00 27.17
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5320 646.75320 646.75320 646.75320 646.777777 777778 8857.5320 87777778 8857.532	2.087 0175320 4.012332 0.12332	******** WEIRULL PLOT POS
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нон 6 7 6		YEAR 1930 1931 1932	ALYZED ELEV,FT. 1194.0 1193.9 1193.5	* * * * * * * * * * * * * * * * * * *	RANK 1 2 3 4	WATER YEAR 1950 1938 1944	ERED EVENTS ELEV,FT. 1194.8 1194.5 1194.4	WEIRULL FLOT FOS 2.08 4.17 6.25
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656665765	-1 -1 -1 -1 -1 -1	1941 1942 1943 1944 1945 1946 1947	1194.0 1194.0 1194.1 1194.4 1194.0 1194.0	****	12 13 14 15 16 17 18	1945 1946 1947 1948 1949 1951 1953 1954	1194.0 1194.0 1194.0 1194.0 1194.0 1194.0	25.00 27.08 29.17 31.25 33.33 35.42 37.50 39.58
657656567658	-1 -1 -1 -1 -1 -1 -1	1948 1949 1950 1951 1952 1953 1954	1194.0 1194.8 1194.8 1194.0 1194.1 1194.0 1194.0	*****	19 20 22 23 24 25 26	1954 1955 1956 1957 1958 1959 1960 1962	1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0	39.58 41.67 43.75 45.83 47.92 50.00 52.08 54.17
6585786684	-i -i -i -i -i -i -i	1955 1956 1957 1958 1959 1960 1961	1194.0 1194.0 1194.0 1194.0 1194.0 1194.0	*****	27 28 29 30 31 32	1763 1764 1766 1767 1768 1767	1174.0 1174.0 1174.0 1174.0 1174.0 1174.0 1174.0	56.25 58.33 60.42 62.50 64.58 66.67 68.75
69965575	-1 -1 -1 -1 -1 -1	1962 1963 1964 1965 1966 1967 1968 1969	1174.0 1194.0 1194.0 1194.0 1194.0 1194.0	*****	334 35 367 339 40	1971 1972 1973 1974 1933 1930 1939	1194.0 1194.0 1194.0 1194.0 1194.0	70.83 72.92 75.00 77.08 79.17 81.25 83.33
9655755556557	-1 -1 -1 -1 -1 -1	1970 1971 1972 1973 1974 1975	1194.0 1194.0 1194.0 1194.0 1194.0 1194.3 1193.5	*****	41 42 43 445 467	1939 1931 1936 1940 1961 1932 1976 1934	1193.9 1193.9 1193.8 1193.6 1193.5 1193.5	83.33 85.42 87.50 89.58 91.67 93.75 95.83 97.92

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64.65 50 64.65 68.75 77.75 77.79 85.67 87.67 87.75	24.68.45567532087532087532 114.68.90087532087532 14.68.90087532087532 14.68.90087532087532 14.68.90087532087532

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1956 1957 1958 1959 1961 1961 1962 1963 1964 1965 1966 1969 1970 1971 1973 1974 1975	19312334567 19332567 19333567 193339 19339 19442 19450 11951 1951 1951 1951 1955 1955	NTS AN. YEAR
11326. 5296. 2182. 3794. 5194. 5193. 4693. 6208. 13688. 13118. 92037. 16309. 9777. 130447. 77633. 20217.	3329. 2474. 2950. 2757. 1984. 2987. 4903. 3931. 11150. 5648. 3422. 10543. 4843. 10641. 10588. 6589. 14723. 7442. 11249. 11249. 10760.	ALYZED FLOW,CFS
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789012345678901234567 222355555555555444444444444444444444444	1234567890123456	RANK
1939 1949 1976 1976 1976 1975 1975 1975 1975 1975 1975 1975 1975	1950 1975 1976 1976 1976 1976 1975 1975 1975 1975 1976 1976 1976 1976 1976 1976 1976 1976	WATER VEAR
5648. 5648. 5648. 55296. 55296. 55296. 48931. 4	21595. 20217. 163093. 13723. 13688. 13118. 13048. 131249. 11428. 11426. 111547. 10881. 10760. 106343. 10533. 10531. 97777. 9203. 77763. 774589. 6208. 5688.	FLOW, CFS
5320875320875320 68.45.67.820 68.45.67.820 68.45.67.820 68.45.87.777788857.5320 88.7777778888799997	2.17532087532087532087532087532087532087532087532087557532087557532087557532087	WEIRULL PLOT POS
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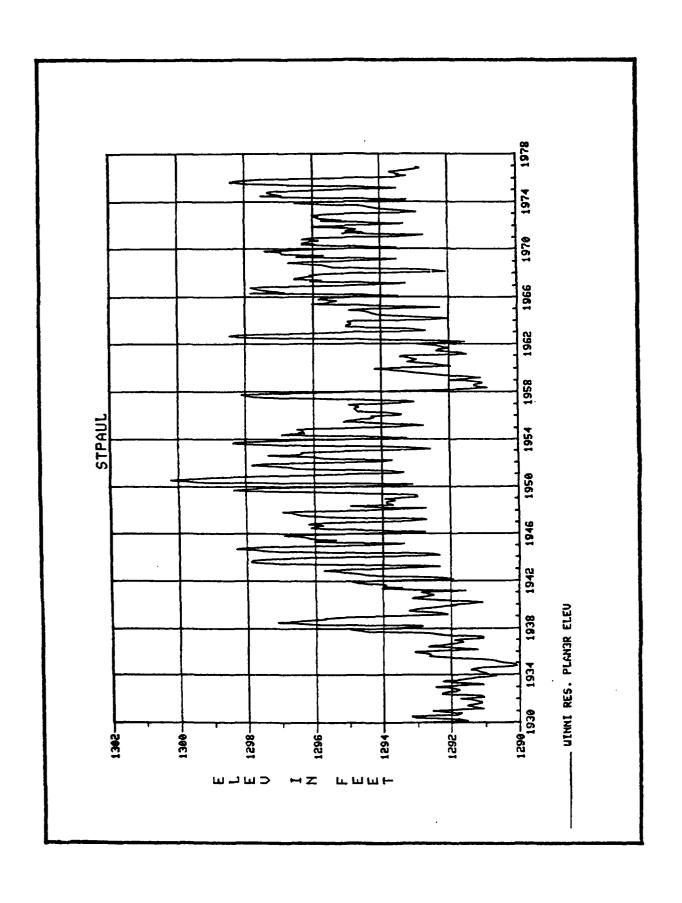
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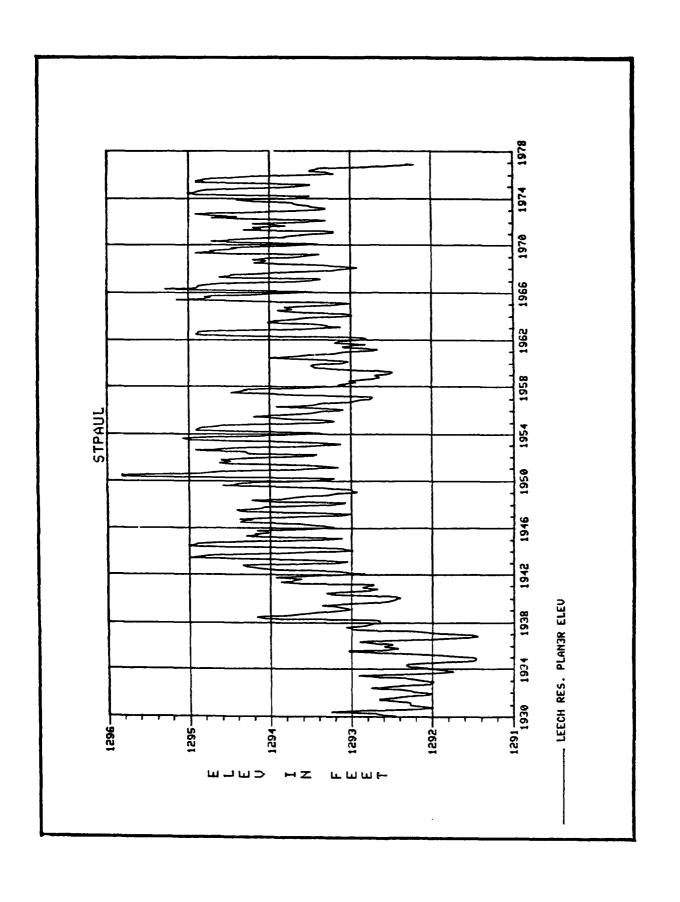
APPENDIX G

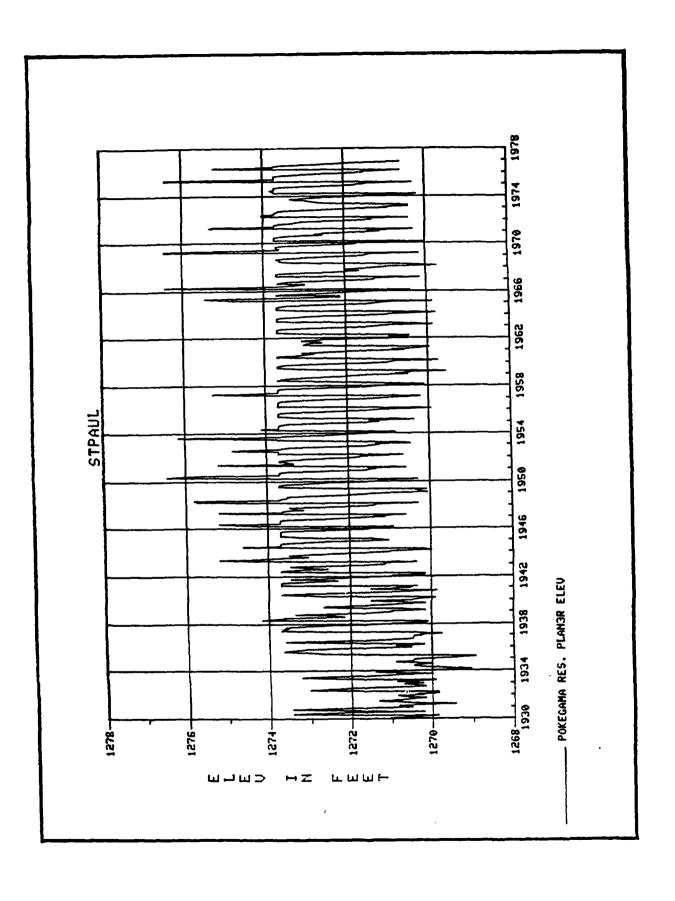
PLAN 3

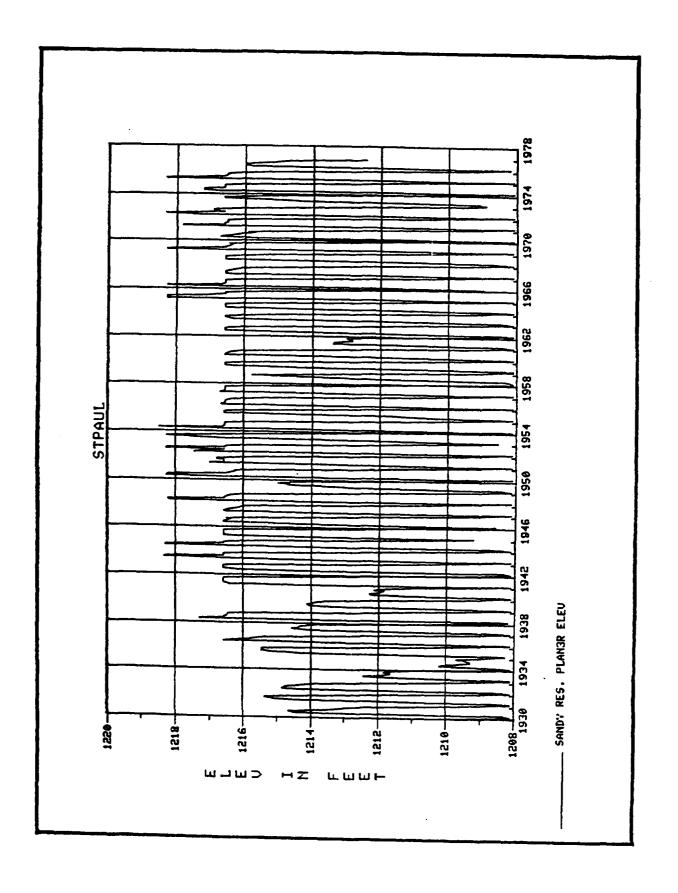
TIME SERIES DATA PLOTS
AND
ANNUAL MAX/MIN DATA TABLES

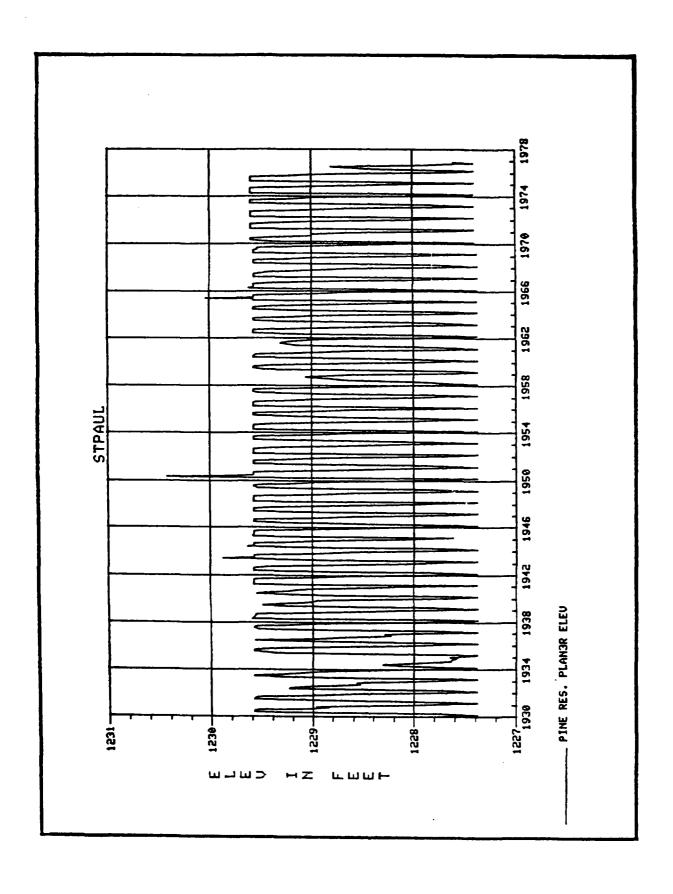
Note: The time series data plots in Appendices E through L are based on the complete period of record used in this study. The annual maximum and minimum data tables are only for the period of 1 May through 30 September for each year. The time series plot may have data values lower than those listed in the minimum data tables.



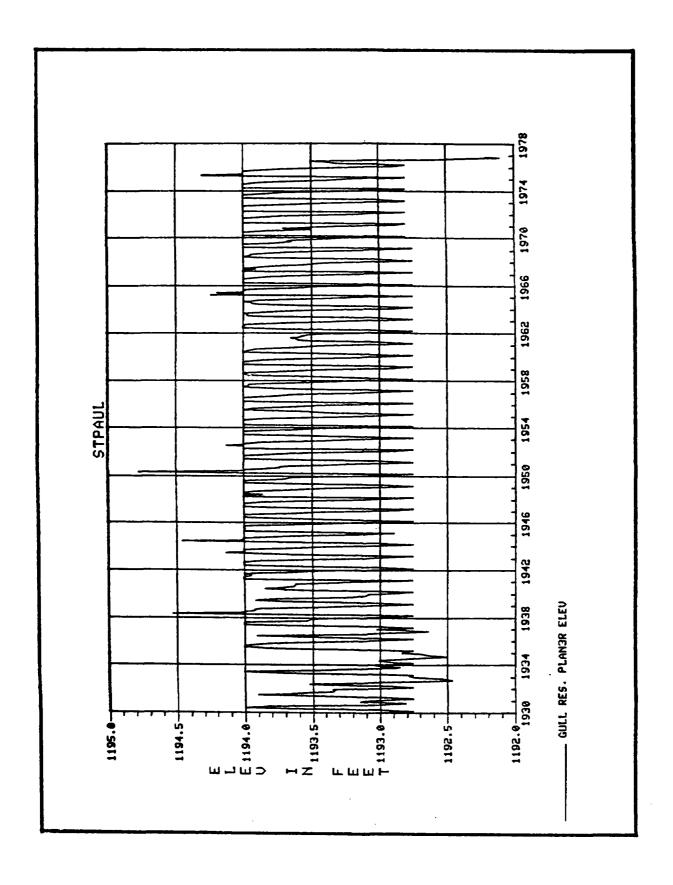


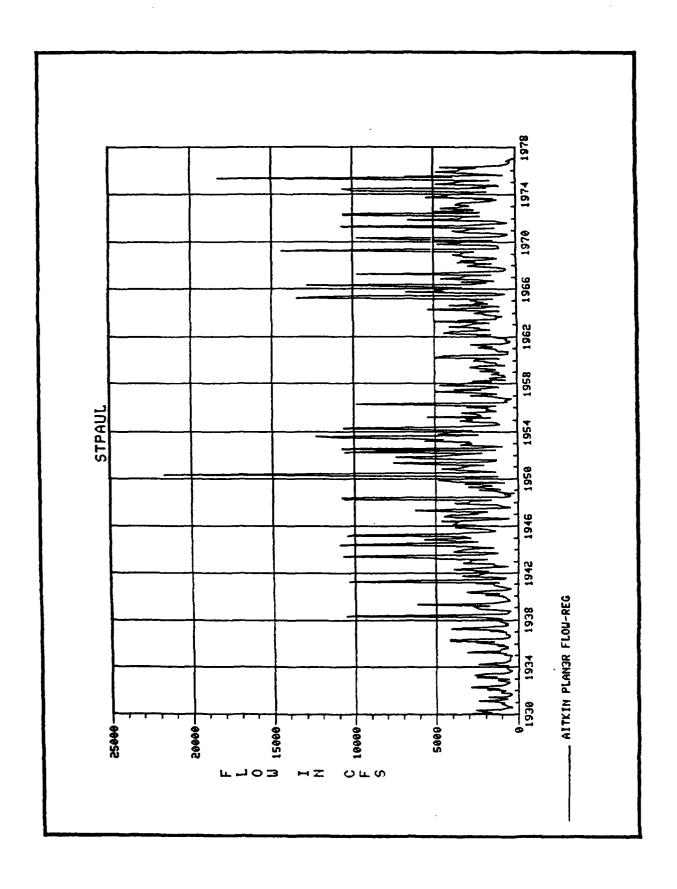


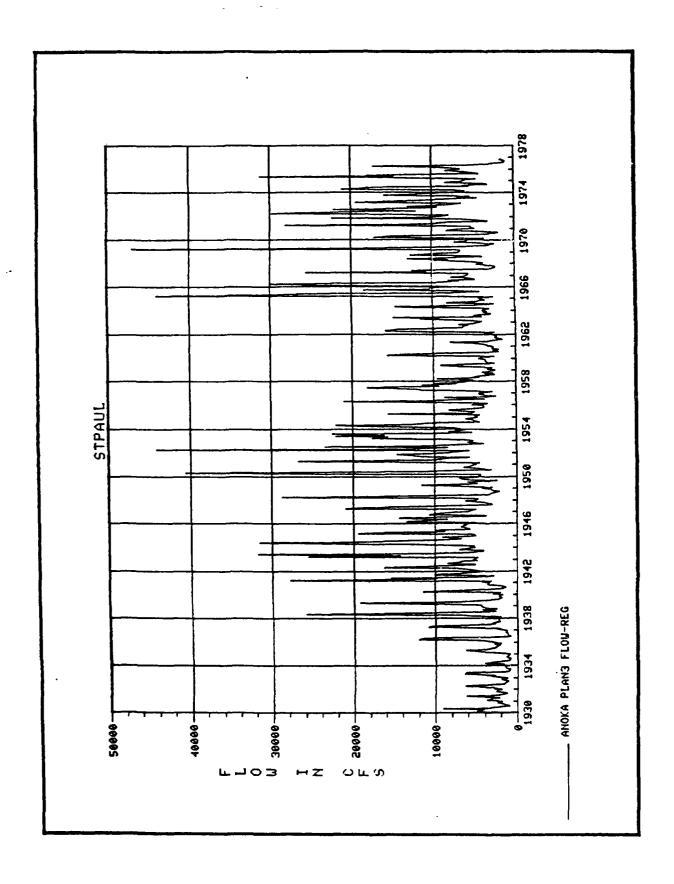




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**	****	****	****	ONS- WINN ******** ALYZED	***	*******	*****	TION ********* ERED EVENTS		*
ķ	HON	DAY	YEAR	ELEV,FT.	1	RANK	YEAR .	ELEV,FT.	WEIRULL PLOT POS	* *
不不 中 年 年 年 年 年 年 年 年 年 年 年 年 年 年 年 年 年 年	676686977759899795979	-11-11-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	19333356789012345678901200000000000000000000000000000000000	122.1.4.6.6.4.1.2.1.0.09.3.3.1.5.9.3.2.3.3.4.9.1.8.0.2.0.8.5.7.1.2.2.9.9.9.3.1.2.2.9.9.9.9.9.9.9.9.9.9.9.9.9.9.9.9.9	~	2345678901234567890123456789	19675394473644218447705655285123846742184977705652851238467336421849771995745386341679954	1222999988 122299988 122299988 1222999988 12229999887 12229999887 12229999887 12229999887 12229999887 12229999887 1222999987 12229999987 122299999999999999999999999999999999	257.00 .008 .008 .017 .023 .033 .035	********************

******	97599687	-1 -1 -1 -1 -1 -1	1969 1970 1971 1972 1973 1974 1975	1296.9 1296.3 1295.0 1295.9 1294.7 1297.5 1298.4 1293.7	****	40 41 42 43 44 45 46 47	1936 1935 1961 1932 1933 1931 1934 1958	1292.6 1292.3 1292.3 1292.2 1291.5 1291.3	83.33 85.450 87.58 91.675 93.82	
	***	****					****	******	,,,,, <u>,</u> ********	k ak z

DI ATTIVA	POSITIONS-	1171117	DECEMBER	EL ELLA TITON
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1	****	****	*****	******	k**	*****	****	*********	*******	**
							ORD	ERED EVENTS		.*
1		DAV	VEAD	CLCU ET	*	RANK	WATER YEAR	51 FU FT		*
4	אטח	DAY	YEAR	ELEV,FT.	* • ¥ ~ •		IEHN	ELEV,FT.	FLUI FUS	- *
1	9	-1	1930	1291.8	*	1	1934	1290.5	2.08	*
*	9	-1	1931	1291.1	*	2	1958	1290.9	4.17	*
1	5	-1	1932	1291.6	*	3	1931	1291.1	6.25	*
1	9	-1	1933	1291.4	*	4 5	1935	1291.2	8.33	*
1	9	-1	1934	1290.5	*	5	1933	1291.4	10.42	*
1	5	-1	1935	1291.2	*	6	1937	1291.4	12.50	*
1	9	-1	1936	1292.0	*	7	1932	1291.6	14.58	*
*	5	-1	1937	1291.4	*	8	1959	1291.6	16.67	*
*	. 5	-1	1938	1295.9	*	9	1930	1291.8	18.75	*
*	· 5	-1	1939	1292.6	*	10	1936	1292.0	20.83	*
4	5	-1	1940	1292.0	*	11	1940	1292.0	22.92	*
1	6	-1	1941	1293.4	*	12	1961	1292.0	25.00	*
1	5	-1	1942	1293.1	*	13	1960	1292.5	27.08	*
1	5 5 5	-1	1943	1293.9	*	14	1939	1292.6	29.17	X
7		-1	1944	1293.3	×	15	1964	1292.9	31.25	*
4	6	-1	1945	1295.4	*	16	1942	1293.1	33.33	*

****	***************************************	** *. *
9965 5 ***	6666575866659675775867885757796677776557555	****
-1 -1 -1 -1 -1 ****		**** EVE
1972 1973 1974 1975 1976 *****		*****
1294.9 1293.8 1295.0 1294.9 1293.5 *******	12268893091123339300344268691229922333930034442686129922333933003444268612992333393003444268691229923333930034442686912299244335336229924433122299292992992222992992222999443351222999443312229999443312229999443312229999443312229999999999	JNS- LEECH ********* ALYZED ELEV,FT.
* * * * * *	 	*** *
43 44 45 46 47 *****	12345678901234567890123456789012	ERVOIF ****** RANK
1933 1936 1932 1931 1934 ****	196534432429520179776125883064136999001758 197554432429520179776125883064136999001758	******
1292.9 1292.9 1292.8 1292.6 1292.3 *******	122225550009997666544.3332222200099985533221100 1222222222222222222222222222222	TION ********** ERED EVENTS ELEV,FT.
99.58 91.67 93.75 95.83 97.92 *******	87532087532087532087532087532087532 01234556789001234556789001234556789001234556789001234556789001234556789001234556789001234555678900123455791334557024680025777798885	WEIRULL
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-01	OTTING	POSITIONS-	LECCH	PECEDUATE	CI CHATTON
	ULLINI	PUSTILINS*	I F F I H	RESERVITION	FIFUALIIIN

*	****	***	*****	*******	**	*****	*****	*******	******	**
*	• • • •	. EVE	MTS AN	ALYZED	* X	• • • • • • •		ERED EVENTS		, X
*	МОМ	DAY	YEAR	ELEV,FT.	* *	RANK	YEAR	ELEV,FT.	PLOT POS	•
*	9	-1 -1	1930 1931	1292.1 1292.3	*	1	1934 1936	1291.5 1291.7	2.08 4.17	*
*	ģ	- i	1932	1292.1	*	3	1933	1291.8	6.25	*
*	9	-1	1933	1291.8	*	4 5	1932	1292.1	8.33	*
¥	9 5	-1 -1	1934 1935	1291.5 1292.3	*	5	1930 1935	1292.1 1292.3	10.42	*
*	9	-1	1936	1272.3	×	7	1931	1292.3	12.50 14.58	Ŧ ¥
*	5	-1	1937	1292.7	*	9	1959	1292.6	16.67	*
¥	9	-1 -1	1938	1293.6	*		1976	1292.6	18.75	*
Î	9	-1	1939 1940	1292.7 1292.8	*	10 11	1958 1937	1292.7 1292.7	20.83 22.92	¥
*		-i	1941	1293.6	*	12	1939	1292.7	25.00	×
*	5	-1	1942	1293.4	*	13	1940	1292.8	27.08	*
*	Ž	-1	1943	1293.9	*	14	1961	1292.8	29.17	*
*	8	-1 -1	1944 1945	1293.6 1294.0	¥	15 16	1949 1956	1293.1 1293.2	31.25 33.33	¥
*	യനനയനനയ	-1	1946	1293.6	*	17	1942	1293.4	35.42	*
*	5	-1	1947	1293.9	*	18	1973	1293.5	37.50	*
*	7	-1	1948	1293.6	*	19	1963	1293.5	39.58	¥

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k k c	**************************************	ķ ķ —
6 5 5 ***	67666866566565555555575578565557866666555595559	MON
-1 -1 -1 h***		DAY
1974 1975 1976 *****	01123456789012345678901234567890123 1199333334442444444455555555666666677777 1199334456789012345678901234 1199334567890123	YEAR
1273.8 1276.4 1275.2 ********	1273.43 12773.43 12773.44 12773.44 12773.44 12773.44 127777.73 127777.75 127777.75 127777.75 127777.75 127777.75 12777.77	ELEV, FT.
* * * *	************************************	* *-
45 46 47 *****	12345678901234567890123456789012345678901234	RANK
1939 1931 1934 ******	1966953885713624884242515678966780095603321 197675485713671995774481567890234780095603321	WATER YEAR
1272.6 1271.3 1270.4 ********	1276.4 12276.4 122776.4 122776.4 1227755.2 1227755.4 12277755.4 122777755.4 122777755.4 12277777777777777777777777777777777777	ELEV,FT.
93.75 95.83 97.92 ******	87532087520875208752087520875208752087520875	WEIRULL FLOT PO
* * *		5 2 52

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65565965595557779569995569	85998595899855568857	אסא
-1 -1 -1 -1 -1 -1 -1 -1	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	
1951 1952 1953 1954 1955 1956 1957 1968 1964 1965 1968 1969 1970 1971 1973 1974 1975	1930 1931 1932 1933 1935 1935 1935 1937 1941 1944 1944 1944 1944 1949 1950	YEAR
1273.7 1273.7 12773.7 12773.7 12773.7 12773.7 12772.8 12772.8 12772.1 12772.1 12772.1 12773.6 12772.1 12773.6 12773.7 12773.7	1270.2 1270.8 1270.6 1270.6 1271.5 1272.8 1272.8 1272.1 1271.0 1271.3 1271.3 1271.3 1271.7 1271.7	ELEV,FT.
***************************************	- 本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本	* * * * * * * * * * * * * * * * * * *
23456789012345678901234567 222222223555555555555678901234567	1234567890112345678901	RANK
19754 19754	1934 1949 1933 1933 1933 1933 1933 1947 1944 1944 1944 1944 1944	WATER YEAR
1272.7 1272.8 1272.8 1272.8 1272.8 12772.9 12773.0 12773.1 12773.1 12773.7 12773.7 12773.7 12773.7 12773.7	1270.0 1270.1 1270.2 1270.6 1270.6 1270.6 1271.0 1271.0 1271.7 1271.7 1271.7 1272.1 1272.1 1272.3 1272.3 1272.5	RED EVENTS ELEV.FT.
45.908 47.908 47.908 47.908 55.908 56.908	2.08 4.153 102.332 104.567 105.008 114.567 118.009 114.567 118.009 119.008 119	WEIRULL PLOT FOS
**		*

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75965555555879599975799	**************************************
	EVE
1953 1954 1955 1955 1955 1958 1959 1961 1962 1964 1965 1969 1970 1970 1971 1973 1974 1975	
1210 6 6 5 6 2 9 7 2 4 4 6 6 2 9 7 2 1 1 2 1 1 2 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1	ELEV,FT. 1211.5 1209.7 1212.1 1209.3 1211.4 1213.8 1211.6.4 1211.5 1216.6 1212.5 1216.6 1212.5 1216.6 1216.6 1216.6 1216.6

456789012345678901234567 22222333333333344444647	
1936 19746 19746 19747 19747 1975 1975 1975 1975 1975 1977 1974 1974 1974 1974	
823571224444 1215557122146666666666666666666666666666666666	********** ELEV,FT. 1208.73 1209.57 12209.57 12209.57 122111.45 122111.45 122112.4 122112.45 122112.13.77 122112.13.77 122112.13.77 122113.78
500.558.558.558.558.558.558.558.558.558.	
***************	不。 一

- ANALYSIS OF HAYTHURE -

1	FLOT	TING ****	FOSITI	ONS- PINE R	ESERVOIR ########	*****	******	******
4				ALYZED	* • • • • • • • • • • • • • • • • • • •	WATER	ERED EVENTS	WEIBULL *
k k	HON	DAY	YEAR	ELEV,FT.	RANK	YEAR	ELEV,FT.	FLOT FOS *
*	_	-1	1930		¥ 1	1950 1965	1230.4 1230.0	2.08 * 4.17 *
*		-1 -1	1931 1932	1229.2	* 23 * 4	1943	1229.9	6.25 *
*	6	-1 -1	1933 1934	1229.6 1228.3	* 4 * 5	1944 1966	1229.9 1229.6 1229.6	8.33 * 10.42 *
*	7	-1	1935	1229.6	* <u>é</u>	1938	1229.6	12.50 *
k k	7	-1 -1	1936 1937	1229.6	* 8	1945 1937	1229.6 1229.6 1229.6	16.67 🛊
*	=	-1 -1	1938 1939	1229.6	y 9 k 10	1935 1941	1229.6 1229.6	18.75 * 20.83 * 22.92 *
*	6	-1	1940	1229.5	* 11	1942	1229.6	20.83 * 22.92 *
*	5 6	-1 -1	1941	1229.6 1229.6	k 12 k 13	1933 1946	1229.6 1229.6 1229.6	25.00 #
*	6	- 1	1942 1943	1229.9	* 14	1947	1229.6 1229.6 1229.6	27.08 * 29.17 * 31.25 * 33.33 * 35.42 *
*	5	-ī -1	1944 1945	1229.6	* 15 * 16	1948 1949	1229.6	33.33 *
k k	7	-1 -1	1946 1947	1229.6	* 17 * 18	1930 1951	1229.6 1229.6 1229.6	35.42 * 37.50 *
*	5	- <u>ĩ</u>	1948	1229.6	* 19	1951 1952 1953	1229.6	39.58 *
*		-1 -1	1949 1950	1229.6	k 20 k 21	1954	1229.6 1229.6	43.75 *
*	é	- <u>1</u> - <u>1</u>	1951 1952 1953	1229.6	2334 2234 2222 2222 234 234 234 234 234	1955 1956	1229.6 1229.6 1229.6 1229.6 1229.6 1229.6	45.83 * 47.92 * 50.00 * 52.08 *
*	6	-1	1953	1229.6	24	1957	1229.6	50.00 X
*	5 7	-1 -1	1954 1955	1229.6	¥ 25 ₹ 26	1959 1960	1229.6 1229.6	54.17 *
*	5	- <u>1</u> - <u>1</u>	1956 1957	1229.6	k 27 k 28	1962 1963	1229.6	56.25 * 58.33 *
*	9	-1	1958	1228.9	k 29	1964	1229.6 1229.6 1229.6 1229.6 1229.6	60.42 *
*	7	-1 -1	1959 1960	1229.6	* 30 * 31	1931 1967	1229.6 1229.6	62.50 * 64.58 *
*	8	-1	1961		* 32	1968	1229.6	66.67 ¥
*	7	-1 -1	1962 1963 1964	1229.6	* 33 * 34 * 35	1969 1970 1971	1229.6	68.75 * 70.83 * 72.92 *
*	6	-1 -1	1964 1965	1229.6	¥ 35 * 36	1971 1972	1229.6 1229.6	72,92 * 75,00 *
*	5	-1	1966	1229.6	k 37	1973 1974	1229.6	77.08 *
*	5	- <u>1</u> - <u>1</u>	1967 1968	1229.8	* 38 * 39	1975	1229.6	79.17 * 81.25 * 83.33 *
*	5 5	-1 -1	1969 1970	1229.6 1229.6 1229.6 1229.6 1229.6	k 40 k 41	1936 1940	1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6	83.33 * 85.42 *
*	5	-1	1971	1229.A 3	k 42	1939	1229.5 1229.3 1229.2 1228.9	87.50 *
*	7	-1 -1	1972 1973	1220.4	k 43 k 44	1961 1932	1229.3 1229.2 1228.9	91.67 *
*	5	-1 -1	1974 1975	1229.6	k 45 k 46	1958 1976	1228.9 1228.8	93.75 * 95.83 *
*		-1	1976	1228.8	k 47	1934	1228.8 1228.3	97.92 *
¥	ボ ボネボオ	****	*****	******	*******	******	· 本本本本本本本本本本本本	*******

9 -1 195 5 -1 195 5 -1 196 5 -1 196 5 -1 196 5 -1 196 6 -1 196 9 -1 196 9 -1 196 9 -1 196 9 -1 196 9 -1 196 1 196 9 -1 196 1 196	
-1 195 -1 195 -1 196 -1 196 -1 196 -1 196 -1 196 -1 196 -1 196 -1 196	555595958555555555555555555555555555555
195 195 196 196 196 196 196 196	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -
578 578 578 578 578 578 578 578 578 578	19332345 1933345 1933345 19333789 1194423 119447 119447 119447 11955 11955 11955 11955 11955
1228.0 1228.0 1228.0 1228.7 12228.7 12228.8 122229.4 122229.1 12229.1 1229.1 1229.1 1229.1 1229.1 1229.1 1229.1 1229.1 1229.1 1229.1 1229.	1228.9 12228.6 12228.7 12228.7 12228.7 12228.7 12228.7 12228.7 12228.7 12228.7 122228.7

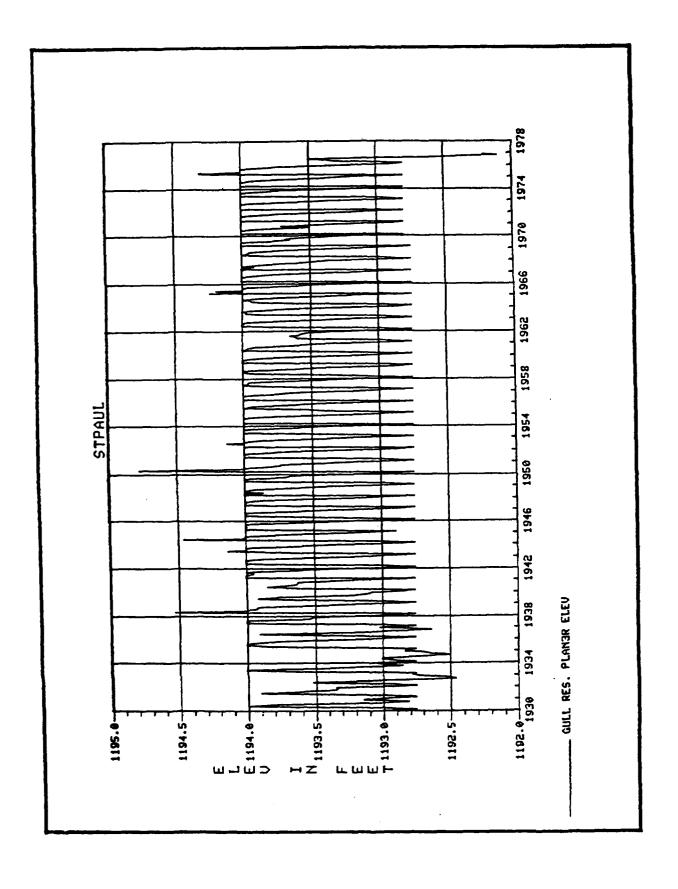
789012345678901234567 2223333333333344444444	12345678901234567890123456 111234567890123456
19448 19769 19769 19769 19769 19769 19769 1977 1977	1974 1975 1975 1975 1975 1975 1975 1975 1975
1228.9 1228.9 12229.4 12229.4 12229.4 12229.6 12229.6 12229.6 12229.6 12229.6 12229.6 12229.6 12229.6 12229.6	1227.6 1227.9 12228.16 12228.6 12228.7 12228.7 12228.7 12228.7 12228.9 12228.9 122228.9 122228.9 122228.9 122228.9 122228.9 122228.9 122228.9 122228.9 122228.9 122228.9
5320 6.33200 6.3320 6.3320 6.3320 6.3320 6.3320 6.3320 6.3320 6.3320 6.3	24.087532087520875208752087520875208752087520875

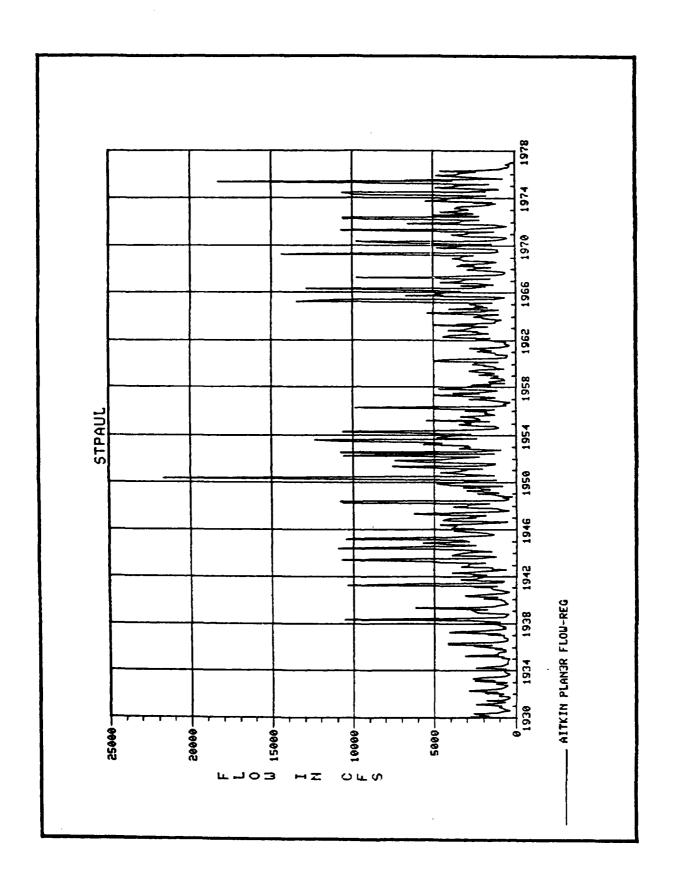
*******	*****	ONS- GULL ******** ALYZED ELEV,FT.	***	******	*****		**************************************
	-0112345678901204567890120456789012045678901204567890120456789012045678901204567890120456789000000000000000000000000000000000000	1194.0 1193.5 1194.0 1193.0 1194.0 1193.0 1194.5 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0	 	1234567890123456789012345678901234567890		ELEV, FT. 1194.54 1194.54 1194.63 11194.61 11194.60 1119	
\$\begin{array}{cccccccccccccccccccccccccccccccccccc	1970 1971 1972 1973 1974 1975 1976	1194.0 1194.0 1194.0 1194.0 1194.0 1194.3 1193.5	****	41 42 43 44 45 46 47	1931 1936 1940 1961 1932 1976 1934	1173.7 1173.8 1173.6 1173.5 1173.5 1173.0	85.42 * 87.50 * 87.58 * 91.67 * 93.75 * 95.83 * 97.92 *

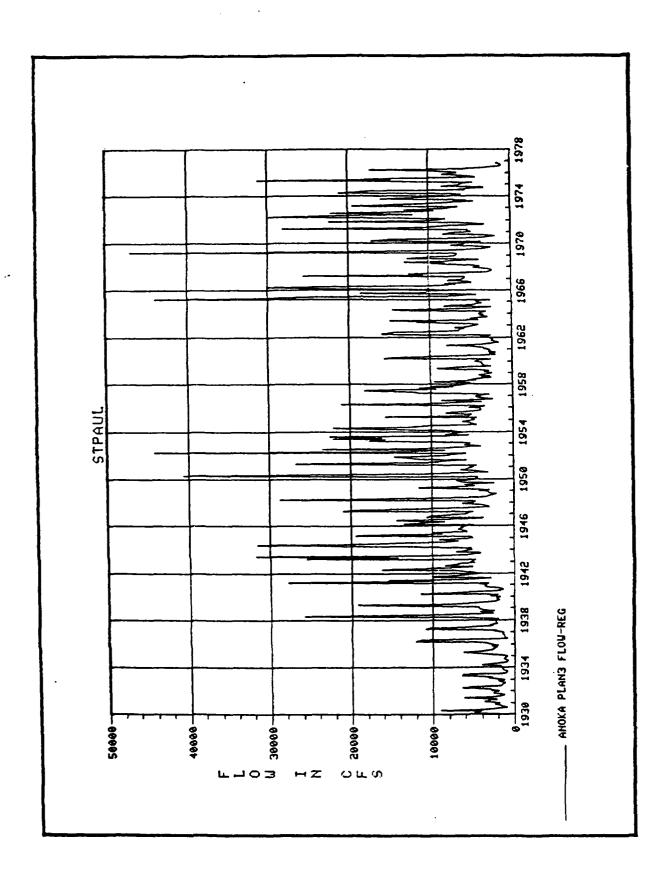
-PLOTTING	POSITIONS-	GILL	RESERVATE	FI FUATION
-LFOILTED	LOSTITOMS-	OULL	VESEVANTV	FFEAHITOM

×	***	****	****	******	XX	*****	******	*********	******
*				ALYZED				ERED EVENTS	
ž	••••				*	•••••	WATER	CHEN EVENIE	WEIRULL
ž	MUN	DAY	YEAR	ELEV,FT.	*	RANK	YEAR	ELEV,FT.	PLOT POS
:		- APRI	ILAN		_ *	MAIN		CLEVIII	1501 503
3			1070	1107 0	- A		1074	1100 5	2 00
7	9	-1	1930	1193.0	*	1	1934	1192.5	2.08
Ŧ	5 9	-1	1931	1193.0	*	23	1976	1192.6	4.17 6.25
¥	7	-1	1932	1192.6	*	Ş	1932	1192.6	
*	9	-1	1933	1193.1	*	4	1936	1192.9	8.33
*	9	-1	1934	1192.5	*	5	1931	1193.0	10.42
*	5	-1	1935	1193.5	*	6 7	1930	1193.0	12.50
*	9	-1	1936	1192.9	*	7	1933	1193.1	14.58
*	5	-1	1937	1193.6	*	8	1955	1193.4	16.67
*	8	-1	1938	1193.9	****	9	1958	1193.4	10.42 12.50 14.58 16.67 18.75
×	5	-1	1939	1193.4	×	10	1939	1193.4	20.83
×	Š	~ī	1940	1193.4 1193.6	×	11	1939 1970	1193.5	22.92
*	7	~ī	1941	1193.9	***	12	1935	1193.4 1193.5 1193.5	20.83 22.92 25.00
Ż	5	-1	1942	1193.6	*	13	1961	1193.5	27.08
ż	. Š	~ī	1943	1193.6	*	14	1964	1193.5	29.17
×	. Š	~i	1944	1193.6	*	15	1963	1193.5	31.25
*	Ă	-i	1945	1194.0	Ŧ	16	1968	1193.5	33.33
¥	. š	-ī	1946	1193.6	*	îž	1959	1193.6	35.42
¥	Š	-i	1947	1193.9	*	î8	1957	1193.6	37.50
×	Ă	-î	1948	1193.9	*	19	1940	1193.6	39.58
*	š	-i	1949	1193.6	*	2 0	1946	1193.6	41.67
*	95958557555555555 9	- 1	1950	1193.7	*	2 <u>1</u>	1949	1193.6	43.75
:	É		1951		*	27			
*	2	-1 -1	1952	1193.6	*	22 23	1969	1193.6	45.83 × 47.92
Ť	, E	-1		1194.0	1	23	1953	1193.6	
•	りゃいいいゃいい		1953	1193.6	*	24	1937	1193.6	50.00
*	õ	-1	1954	1194.0	***	25	1960	1193.6	52.08
*	5	-1	1955 1956	1193.4 1193.9 1193.6	Ţ	26 27 28	1942 1962	1193.6 1193.6	54.17 56.25
*	7	-1	1730	1173.7		56	1702	1173.6	56.25
¥	5	-1	1957	1173+0	*	₹8 20	1944	1193.6	58.33
₹	3	-1	1958	1193.4	¥	29	1943	1193.6	60.42

*	5	-1	1959	1193.6	*	30	1951	1193.6	62.50	•
*	5	-1	1960	1193.6	*	31	1973	1193.6	64.58	×
*	5	-1	1961	1193.5	*	32	1950	1193,7	66.67	*
*	5	-1	1962	1193.6	*	33	1967	1193.8	68.75	*
*	5 5 5	-1	1963	1193.5	*	34	1948	1193.9	70.83	*
*		~1	1964	1193.5	*	35	1956	1193.9	72.92	*
*	8	-1	1965	1194.0	*	36	1947	1193.9	75.00	*
*	7	-1	1966	1193.9	*	37	1938	1193.9	77+08	*
¥	2	~]	1967	1193.8	¥	38	1974	1193.9	79・17	*
*	J O	-1 -1	1968 1969	1193.5 1193.6	Ţ	39	1966	1193.9	81.25	¥
•	6	-1	1970	1173.0	*	40 41	1941 1971	1193.9 1194.0	83.33 85.42	¥
*	ó	-1	1971	1173.3	*	42	1965	1174.0	87.50	*
*	5	~i	1972	1194.0	ž	43	1945	1194.0	89.58	Ť
*	5 5	-ī	1973	1193.6	*	44	1952	1194.ŏ	91.67	*
*	9	-1	1974	1193.9	×	45	1972	1194.0	93.75	*
*	6	-1	1975	1194.0	*	46	1975	1194.0	95.83	*
*	9	-1	1976	1192.6	*	47	1954	1194.0	97.92	*
- 1	****	***	****	*****	***	* * * * * * *	****	*****		







*******	************************************
97599687	HDN 7676686977775989979597989678989769796579
-1 -1 -1 -1 -1 -1 ****	BAY -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
1969 1970 1971 1972 1973 1974 1975 1976	Y - 199333333344444567890123456789012345678 Y - 1993333333344444444444445555555556789012345678
1296.9 1295.0 1295.9 1294.7 1297.5 1298.4	ELEV, FT. 1293.53 1299122.46 129912299129912991299129912991299129912

40 41 42 43 44 45 46 47	RANK-123456789011234567890122345678901233456789
1936 1935 1961 1932 1933 1931 1934	WATER TO 25 THE PROPERTY OF TH
1292.6 1292.3 1292.3 1292.3 1292.5 1291.5 1291.3 *******	ELEV, FT. 1300.444.330098.444.1229988.330098.444.1229988.3300988.122997777777777777777777777777777777777
83.33 85.50 87.50 87.67 93.75 95.83 97.92	WEIRT -087 -017532087 -017532087 -017532087 -017532087 -017532087 -017532087 -0175322087 -017532087 -017532087 -017532087 -017532087 -017532087 -017532087 -017532087 -017532087 -017532087 -01753208 -01753208 -01753208 -01753208 -01753208 -0175320
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5565955555555555555555566566655559* **	995995955555556	****
	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	**** • • EVE
194489 19449555555555555555555555555555555555	1930 1931 1932 1933 1934 1936 1936 1938 1939 1940 1941 1942 1944 1945	*****
1293.4 1293.4 1293.4 1293.4 1293.4 1293.1 1295.1 1295.1 1295.1 1297.1 12	1291.8 1291.1 1291.6 1291.4 1290.5 1291.2 1292.0 1291.4 1295.6 1292.0 1293.4 1293.1 1293.3 1293.4	ONS- WINN ********* ALYZED
***************************************	**********	***
7890123456789012345678901234567 ************************************	1 23 4 5 6 7 8 9 10 11 12 13 14 15 16	
1964491199457116665259273844560**	1934 1958 1931 1935 1933 1937 1932 1959 1936 1940 1961 1964 1964 1942	******
233334456677779356678911299333333333333333333333333333333333	1290.5 1290.9 1291.1 1291.2 1291.4 1291.6 1291.6 1292.0 1292.0 1292.5 1292.1	TION ########### ERED EVENTS ELEV,FT.
2087532087532087532087532087532087532087532087532087532087532087532087532087532087532087532087532************************************	2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.67 20.83 22.92 25.00 27.08 27.08 27.125 33.33	******** WEIRULL PLOT POS
******************	****************	****

****)	
99655	**	-PLOT
-1 -1 -1 -1	****	FING
1972 1973 1974 1975 1976	*****	POSITI
1294.9 1293.8 1295.0 1294.9 1293.5	**************************************	IONS- LEECI
****	****	H RE
43 44 45 46 47	** RAN 1234567890112345678901123456789011234567890112345678901123456789011234567890124567890124567890124567890124567890124567890124567890124567890124567890124567890124567890124567890124567890124567890124567890124567890124567890100000000000000000000000000000000000	SERVOI
1933 1936 1932 1931 1934	*******	R ELEVAT
1292.9 1292.9 1292.8 1292.6 1292.3	**************************************	TION
89.58 91.67 93.75 95.83 97.92	**************************************	
****	* *	

595559595955555995599965999**	****
	**** ••EVE
195123456789 195129555789 19553456789 19753456789 1197556789 11977345 119777345 119777345	*****
11294.13 11294.13 1294.13 12294.39 122994.39 122993.20 122993.30 122994.88 122994.5 122994.5 122994.5 122994.5 122994.5 122994.6	ONS- LEECH ********** ELEV,FT. 1292.1 1292.3 1292.1 1291.5 1292.7 1292.7 1292.7 1293.6 1293.6 1293.6 1293.6 1293.6 1293.6 1293.6 1293.6
**************************************	RESERVA** RESER** ANA 1234567890112345678901123145678911123456789111111111111111111111111111111111111
1960 1944 1948 1948 1948 1948 1953 1957 1957 1957 1957 1957 1952 1952 1952 1955 1955 1954 1954 1954 1954 1966 1966 *****	******
566666678889999011229933.3.3.3.3.3.3.3.3.3.3.3.3.3.3.3.3.3	ION ********** ********* ********* *****
41.0.753.2087.532.087.556.0.668.0.77.79.1.532.0885.556.668.0.77.79.1.532.0885.0.668.0.77.79.1.532.0885.0.668.0.77.79.1.532.0885.0.668.0.77.79.1.532.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.77.9.885.0.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.885.0.9.89.7.9.89.7.89.7.9.89.7.9.89.7.9.9.89.7.9.9.89.7.9.9.9.9	********** **EIRULL PLOT POS 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.75 20.83 225.00 27.08 27.08 27.08 27.08 27.50 33.33 35.55 37.50 39.58
***************************************	************************

***	***	***	****	ONS-FOKE** **********	***	******	******	TINE ELECTION ***S ELECTION ***S ********************************	• WFL 24 68.45587532087532587532087532208753233333333333333333333333333333333333	有 有 有 本 本 本 本 本 本 本 本 本 本 本 本 本 本 本 本 本
* * * *	6 5 5 ***	-1 -1 -1 ****	1974 1975 1976 *****	1273.8 1276.4 1275.2 *******	* * * *	45 46 47 *****	1939 1931 1934 ******	1272.6 1271.3 1270.4 *******	97.92	***

- ANALYSIS OF MINIHUMS -

********************	一本本本本本本本本本本本本本本本本本本本本本本本本本本本
655659655955577956999555	**** MON 8 5
	ING **EVE -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
1723 1755 17755 17755 17755 1775 1775 1775	******
1273.3 1273.7 1273.7 12773.1 12773.7 12772.2 12772.2 12772.2 12772.3 12772.3 12772.3 12773.5 12773.5 12773.6 12773.6 12773.7	ELEV,FT. 1270.2 1270.8 1270.6 1271.5 1272.8 1272.1 1273.6 1273.7 1273.7
*************************	G* • -
2345678901234567890123454 2222222235555555555444444	RESER**********************************
19753207 19753207 197546357 197546357 197547 197547 1975465 1975465 1975465 1975465 1975465	******
1272.5 1272.7 1272.8 1272.8 1272.8 1272.8 1273.0 1273.1 1273.1 1273.1 1273.5 1273.5 1273.7 1273.7	ELEV.FI
3208753208753208753208755566666667777778888755	**************************************
******************	******************

1 1	(****)	****	*****	ONS~ SANTY ********* ALYZED	***	SERVOIR	******* ORDE	ION ********* RED EVENTS	*****
1		DAY	YEAR	ELEV.FT.	*	RANK	WATER YEAR	ELEV,FT.	WEIRULL * PLOT FOS *
a marka na ka	797768675875766566585578585598667975557555	167	193333567890123456789012345678901231993356789012319933567890123199442345678901234567890123199442345678901231199442345678901234567890123119946667890123	12154.0.1.4.653.1.3.6.6.3.3.6.6.273.0.3.3.5.6.6.3.6.6.3.6.6.3.6.6.273.0.3.3.5.6.6.3.6.6.3.6.6.3.6.6.3.6.6.273.0.3.3.5.6.6.3.6.3.6.6.3.6.6.3.6.6.3.6.6.3.6.6.3.6.6.3.6.6.3.6.6.3.6.6.3.6.6.3.6.3.6.6.3.3.6.	***************************************	RA- 1234567890123456789012322222223333333333344443	19440235569258184177605577690234678123651289079119955566925818417111111111111111111111111111111111	12188.3.3.3.3.3.2.8.3.2.0.7.7.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6	**************************************
* * *	6	-1 -1 -1	1973 1974 1975	1216.6 1217.2 1218.3	* * *	44 45 46	1961 1933 1940	1212.4 1212.3	91.67 93.75 95.83

- ANALYSIS OF HINIMUMS -

-P1	DALLTU	POSITIONS-	SANDY	RESERVOIR	ELEVATION
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LUTING FUBLINGS ANALYZED. ************************************	宋本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本	*******************	**
**************************************	596555555587959	555595559555555555559955	***
**************************************	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	-11-11-11-11-11-11-11-11-11-11-11-11-11	**** ••EVE
**************************************	1954 1955 1955 1955 1956 1966 1966 1966 1966	1737 17339 17939 17941 17942 17944 17946 17949 17949 17951	***** NTS AN
**************************************	1216.6 1216.5 1216.2 1208.9 12013.7 12112.4 12113.4 1216.6 1216.6 12111.9	1208.7 1218.7 1219.9 12113.1 12114.1 12114.1 12114.1 12115.5 12115.1 12116.1 12116.1 12116.1 12116.1 12116.1 12116.1 12116.1 12116.1	********** ALYZED
**************************************	**************	***************	**** •*•• *
**************************************	22333333533334443	11 12 13 14 15 16 17 18	*****
######################################	19746 19746 19747 19747 19759 19751 19751 19751 19752 19752	1953 1933 1933 1933 1955 1945 1955 1955 1964 1963 1933 1963 1964 1964 1964 1964 1964	(******
	1215.5 1215.1 1215.1 1216.1 1216.4 12216.4 12216.4 12216.6 12216.6 12216.6	1208.7 1209.3 1209.7 1210.5 1210.6 1211.2 1211.4 1211.5 1211.6 1211.6	********** RED EVENTS
	54.175 56.320 56.450 66.775 7777 835.450 877.777 835.450 877.558 877.558 871.558	2.08 4.15 8.32 10.50 112.50 114.55 118.82 225.00 27.15 335.50 37.55 37.58 413.82 413.82	WEIBULL

-	PLOT	TING	FOSITI	ONS- FINE R	ESERVOIR	ELEVAT	[ON **********	******
*				ALYZED	* • • • • • • •	ORDE	RED EVENTS	
*	HON	DAY	YEAR	ELEV,FT.	RANK	WATER YEAR	ELEV,FT.	WEIRULL * FLOT FOS *
*	6	-1	1930	1229.6	k 1	1950	1230.4	2.08 *
*		-1 -1	1931		k 2 ∤ 3	1965 1943	1230.0 1229.9 1229.6	4.17 * 6.25 * 8.33 *
*	6	-1	1932 1933	1229.6	* 4	1944 1966	1229.6	8.33
*	7	-1 -1	1934 1935	1229.6	k 5 k 6 k 7	1938	1229.6	10.42 * 12.50 * 14.58 *
*	6 7	-1 -1	1936 1937	1/27.0	* 7 * 8	1945 1937	1229.6 1229.6 1229.6 1229.6	16.67
*	5	- <u>1</u>	1938 1939	1229.6	k 9 k 10	1935 1941	1229.6 1229.6 1229.6	18.75 * 20.83 * 22.92 *
*	6	-1	1940	1229.5	k 11	1942	1229.6	22.92 *
*		-1 -1	1941 1942	1229.6	k 12 k 13	1933 1946	1229.6 1229.6	25.00 * 27.08 *
*	ě	- <u>1</u>	1943 1944	1229.9	k 14 k 15	1947 1948	1229.6 1229.6 1229.6	29.17 * 31.25 * 33.33 *
*	5	-ī	1945	1229.6	k 16	1949	1229.6	33.33
*	6	-1 -1 -1	1946 1947	1229.6 1229.6 1229.6	k 17 k 18	1930 1951 1952	1229.6 1229.6	35.42 * 37.50 * 39.58 *
***	5	-1 -1	1948 1949	1229.6	18 19 19	1952 1953	1229.6 1229.6	39.58 * 41.67 *
*	Ś	-1	1950 1951	477A A .	k 21	1954	1229.6	43.75 *
*		-1 -1	1952 1953	1229.6	22	1955 1956	12299.6 122299.6 122299.6 1222299.6 1222299.6 1222299.6 1222299.6	45.83 * 47.92 * 50.00 *
*	6 5	-1 -1	1954	1229.6	24 k 25	1957 1959	1229.6 1229.6	50.00 * 52.08 *
*	7	- <u>1</u> - <u>1</u>	1955 1956	1229.6	25 26 27	1960 1962	1229.6	52.08 * 54.17 * 56.25 *
*	7	-1	1957	1227.0	k 28	1963	1229.6 1229.6 1229.6 1229.6 1229.6	58.33 *
*	7	-1 -1	1958 1959	1228.9 1229.6	k 30	1964 1931	1229.6	60.42 * 62.50 *
*	6 8	-1 -1	1960 1961	1229.6	k 31 k 32	1967 1968	1229.6 1229.4	64.58 * 66.67 *
*	6	-1	1962	1229.6	k 33	1969	1229.6	68.75 *
*	6	-1 -1	1963 1964	1227.6	34 35	1970 1971	1229.6	70.83 * 72.92 *
*	6 5	-1 -1	1965 1966	1230.0	k 36 k 37	1972 1973	1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6	75.00 * 77.08 *
*	Ž	- <u>1</u> -1	1967 1968	1229.6		1974 1975	1229.6	79.17 *
*	Š	-1	1969	1229.6	k 40	1936	1229.6	83.33 *
*	ວ 5	-1 -1	1970 1971	1229.6	k 41 k 42 k 43	1940 1939	1229.5 1229.5	85.42 * 87.50 *
* *	557 557 557	- <u>1</u>	1972 1973	1229.6	k 43 k 44	1961 1932	1229.3	89.58 * 91.67 *
*	ź	-1	1974	1229.6	k 45	1958	1228.9	93.75 x
*		-1 -1	1975 1976	1228.8		1976 1934	1228.8 1228.3	95.83 * 97.92 *
×	****	(***	****	******	******	*****	(**********	********

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### WATER WEIRULL	1958 1959 1961 1961 1962 1963 1964 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975	193345 1933345 193335 19339 119445 119445 119449 11949 11951 11951 11953 11953	
* RANK YEAR ELEV, FT. FLOT POS * 1 1934 1227.6 2.08 * 2 1976 1227.9 4.17 * 3 1958 1228.0 6.25 * 4 1931 1228.1 8.33 * 5 1959 1228.6 10.42 * 6 1932 1228.6 12.50 * 7 1955 1228.6 14.58 * 8 1936 1228.7 18.75 * 10 1933 1228.7 20.83 * 11 1961 1228.8 25.00 * 13 1935 1228.8 27.08 * 14 1963 1228.8 27.08 * 14 1963 1228.9 33.33 * 17 1930 1228.9 31.25 * 16 1949 1228.9 33.33 * 17 1937 1228.9 33.42 * 18 1957 1228.9 35.42 * 19 1940 1228.9 37.50 * 19 1940 1228.9 37.50 * 20 1973 1228.9 43.75 * 21 1951 1228.9 43.75 * 22 1953 1228.9 45.83 * 23 1947 1228.9 50.00 * 33 1967 1228.9 50.00 * 33 1967 1228.9 50.00 * 33 1969 1229.5 70.83 * 35 1938 1228.9 50.00 * 36.67 * 37 1966 1229.5 70.83 * 38 1948 1229.5 70.83 * 39 1964 1228.9 50.00 * 31 1970 1229.6 87.50 * 31 1970 1229.6 87.50 * 31 1956 1229.6 87.50 * 31 1974 1229.6 83.33 * 35 1938 1229.6 77.08 * 38 1948 1229.6 87.50 * 39 1954 1229.6 83.33 * 41 1941 1229.6 85.42 * 42 1971 1229.6 85.42 * 44 1945 1229.6 87.50 * 45 1974 1229.6 87.50 * 45 1974 1229.6 87.50 * 46 1975 1229.6 87.50 * 47 1950 1229.6 97.67	1228.0 1228.9 1228.9 1228.9 1228.9 12229.1 12229.1 12229.1 12229.1 12229.1 12229.1 12229.1 12229.1 12229.1 12229.1 12229.1 12229.1	1228.7 1228.7 1228.7 1228.7 1228.7 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9	ELEV,FT.
#ATER	************	******************	*
WATER YEAR ELEV, FT. FLOT POS 1934 1227.6 2.08 1976 1227.9 4.17 1958 1228.0 6.25 1931 1228.1 8.33 1959 1228.6 10.42 1932 1228.6 14.58 1936 1228.7 16.67 1939 1228.7 18.75 1933 1228.7 20.83 1961 1228.8 25.00 1935 1228.8 27.08 1961 1228.8 27.08 1963 1228.8 27.08 1963 1228.9 31.25 1944 1228.9 37.50 1949 1228.9 37.50 1949 1228.9 37.50 1949 1228.9 37.50 1940 1228.9 37.50 1951 1228.9 41.67 1951 1228.9 45.83 1973 1228.9 45.83 1974 1228.9 45.83 1974 1228.9 50.00 1968 1228.9 45.83 1974 1228.9 50.00 1969 1229.6 6.50 1966 1229.5 70.83 1938 1229.5 72.92 1965 1229.6 85.42 1971 1229.6 81.25 1952 1229.6 81.25 1954 1229.6 81.25 1974 1229.6 87.50 1975 1229.6 87.50 1975 1229.6 87.50 1976 1229.6 87.50 1977 1229.6 87.50 1977 1229.6 87.50 1977 1229.6 87.50 1977 1229.6 87.50 1977 1229.6 87.50 1977 1229.6 87.50 1977 1229.6 87.50	333333333344444567	11 12 13 14 15 16 17 18	
ELEV, FT. FLOT FOS 1227.6 2.08 1227.9 4.17 -1228.0 6.25 1228.6 10.42 1228.6 12.50 1228.7 18.75 1228.7 18.75 1228.7 20.83 1228.7 22.92 1228.8 27.08 1228.9 33.33 1228.9 37.50 1228.9 37.50 1228.9 47.92 1228.9 50.00 1229.6 88.75 1229.6 88.75 1229.6 87.50 1229.6 87.58 1229.6 87.58 1229.6 87.58 1229.6 87.58 1229.6 87.58 1229.6 87.58 1229.6 87.58	1943 1964 1968 1969 1969 1953 1953 1955 1955 1977 1977 1977 1975	1975356931653097703119119119119119119119119119119119119119	WATER
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	420 420 450 460 460 460 460 460 460 460 46	4.5.340 80.0.5.5675 80.0.5.5675 80.0.7.5.340	WEIRULL FLOT POS

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7	k .			ALYZED ELEV,FT.	1	7	ORD WATER YEAR	ERED EVENTS	MEIBULL :	*
X	י חחוא	DAY	YEAR	ELEVIFI.	k k-	RANK	1 EHN	ELEV,FT.	PLOT PÖS :	* *
7	7	-1 -1	1930 1931	1194.0 1193.9	X		1950 1938	1194.8 1194.5	4.17	*
*		-1 -1	1932 1933	1193.5 1194.0	*	. <u> </u>	1944 1975	1194.4 1194.3	8.33	*
*	7	-1 -1	1934 1935	1193.0 1194.0	*	6 3	1965 1943	1194.2 1194.1	12.50 ×	
*	6	-1 -1	1936 1937	1193.9 1194.0	k	8	1952 1937	1194.1 1194.0	14.58 × 16.67 × 18.75	ķ.
*		-1 -1	1938 1939	1194.5 1193.9	*	10	1941 1942	1194.0 1194.0	20.83 1	ľ
*	: 5	-1 -1	1940 1941	1193.8 1194.0	*	12	1935 1945	1194.0 1194.0	25.00 x	k
*	6	-1 -1	1942 1943	1194.0 1194.1	*	14	1946 1947	1194.0 1194.0	27.08 x 29.17 x	۲
*	5	-1 -1	1944 1945	1194.4 1194.0	ĸ	16	1948 1949	1194.0 1194.0	31.25 × 33.33	ķ
*	7	-1 -1	1946 1947	1194.0 1194.0	k	17	195 <u>1</u> 1953	1194.0 1194.0 1194.0	35.42 37.50 39.58	k k
7	6	-1 -1	1948 1949	1194.0 1194.0	ķ	20	1954 1955	1194.0	41.67	k
*	5	-1 -1	1950 1951	1194.8 1194.0	*	21 22 23	1956 1957	1194.0 1194.0	43.75 45.83	Ķ. Ķ
*		-1 -1	1952 1953	1194.1 1194.0	*	24	1958 1959	1194.0 1194.0	47.92 x 50.00 x	k K
***	. Š	-1 -1 -1	1954 1955	1194.0	*	25 26 27	1960 1962 1963	1194.0 1194.0	50.00 x 52.08 x 54.17 x 56.25 x	K
*	7	-1 -1	1956 1957 1958	1194.0 1194.0 1194.0	*	28	1763 1964 1966	1194.0 1194.0 1194.0	58.33 1 60.42 1	
*	6 6	-i -1	1959 1960	1194.0	**	28 29 30 31	1967 1968	1194.0 1194.0	62.50 i	ķ
**	. 8	-1 -1	1961	1193.6	*	32	1969 1970	1194.0	66.67 1 68.75 1 70.83	
**	9	-1 -1	1962 1963 1964	1194.0	*	34	1971 1972	1194.0 1194.0	70.83 i	ķ
*	6	-1 -1	1965 1966	1194.2 1194.0	*	36	1973	1194.0	75.00 77.08	k k
*	5 7	- <u>1</u>	1967 1968	1194.0	*	38 39	1933 1930	1194.0 1194.0	75.00 1 77.08 1 79.17 1 81.25 1	ķ
*	5	-i -i	1969 1970	1194.0 1194.0	*	40 41	1939 1931	1193.9	85.42	
***	5 5	-i -i	1971 1972	1194.0 1194.0	*	42	1936 1940	1193.9 1193.8	87.50 89.58	
*	ě	-ī	1973	1194.0	*		1961	1193.6	91.67	Į.

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1193.6 1193.6 1193.8 1193.9 1193.9 1193.9 1193.9 1193.9 1193.9 1194.0 1194.0 1194.0 1194.0 ************************************	1192 1192 1192 1192 11192
624.6.7532087532087556753208755320875532087556753208755675320875567532	2.08 2.08

-PI OTTING	POSTTIONS-	ATTETN	EI DIJ
	LOSTITOMS_	MT I UTIA	r L U W

			********* ALYZED			ORIN	K******** ERED EVENTS	
* MON	DAY	YEAR	FLOW, CFS	*	RANK	WATER YEAR	FLOW, CFS	WEIRULL FLOT FOS
**************************************	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	1931234 1933234 193334 193334 193336 19336 19336 19336 1944 1944 1944 1955 1955 1955 1955	2784. 2390. 2848. 2610. 2442. 3057. 4123. 4004. 10513. 6117. 3066. 10318. 3885. 10624. 10891. 4601. 6201. 4601. 10732. 412249. 105484. 12249.		123456789012345678901223456	1955 1975 1976 1976 1976 1976 1976 1976 1974 1977 1977 1977 1977 1977 1975 1975 1975	21595. 18246. 143298. 123791. 12249. 10732. 10684. 10624. 10555. 10555. 10513. 103918. 98013. 98016. 98016. 98016. 98016. 94095. 7510. 6117. 5423. 5317.	2.08 4.17 6.17 6.17 6.17 10.17 10.17 10.17 10.17 10.17 10.17 11.17

ŧ	4	-1	1956	9803.	ŧ	27	1960	4927.	56.25	±
*	5	-i	1957	4913.	ž	28	1963	4914.	58.33	ž
*	ī	-ī	1958	2944.	¥	29	1957	4913.	60.42	*
*	. 6	-1	1959	2817.	*	30	1949	4811.	62.50	×
*	4	-1	1960	4927.	*	31	1946	4601.	64.58	×
*	5	-Ī	1961	2731.	*	31 32	1976	4512.	66.67	×
*	5	-1	1962	4404.	*	33	1962	4404.	68.75	*
*	4	-1	1963	4914.	*	34	1936	4123.	70.83	*
*	5	-1	1964	5317.	*	35	1937	4004.	72.92	*
*	4	-1	1965	13398.	*	36	1942	3885.	75.00	*
*	5	-1	1966	12791.	*	37	1968	3784.	77.08	*
¥	4	-1	1967	9716.	*	38	1940	3066.	79.17	*
*	12	-1	1968	3784.	*	39	1935	3057.	81.25	*
*	4	-1	1969	14325.	*	40	1958	2944.	83.33	*
*	5	-1	1970	9695.	*	41	1932	2848.	85.42	*
*	5	-1	1971	10666.	*	42	1959	2817.	87.50	*
*	. 5	-1	1972	10524.	*	43	1930	2784.	89.58	*
¥	10	-1	1973	5426.	*	44	1961	2731.	91.67	*
¥	6	-1	1974	10578.	*	45	1933	2610.	93.75	*
*	5	-1	1975	18246.	*	46	1934	2442.	95.83	*
*	4	-1	1976	4512.	. *	47	1931	2390.	97.92	*
×	XXXXX	****	(ZXXXXXX	********	***	*****	******	********	. * * * * * * * * * *	XX

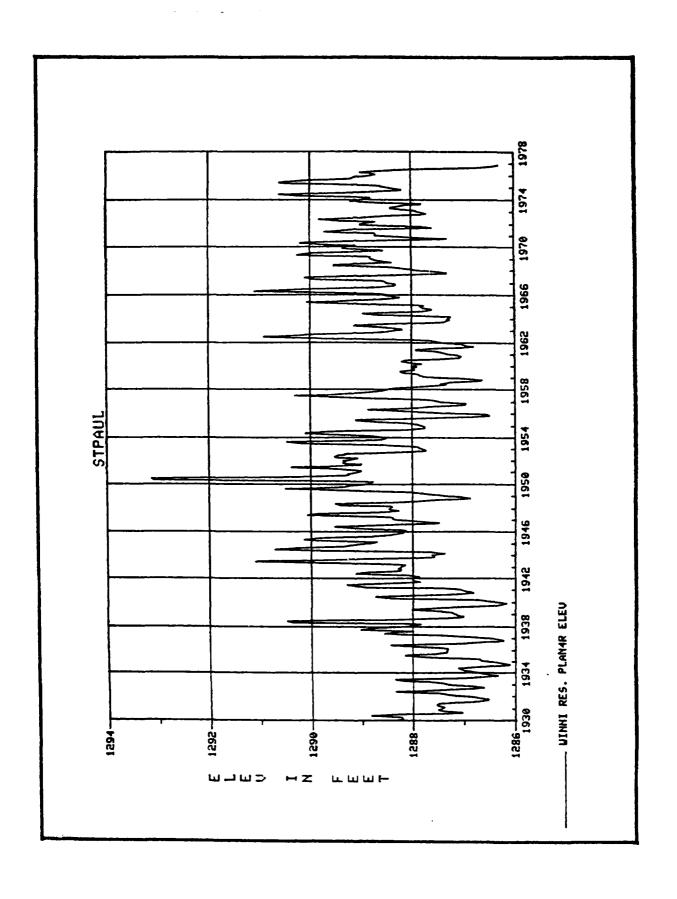
• • • •	EVE	NTS AN	ALYZED	**************************************	WATER	********* ERED EVENTS	WEIBULL
МОМ	DAY	YEAR	FLOW, CFS	* RANK	YEAR	FLOW, CFS	PLOT POS
8	-1	1930	942.	* 1	1934	700+	2.08
9 10	-1 -1	1931 1932	1247. 1162.	* 1 * 2 * 3	1936 1933	827. 862.	4.17 6.25
9 8	-1	1933	862.	* 4	1935	870,	8.33
8	-1	1934	700. 870.	* 5 * 6	1930 1976	942. 1048.	10.42 12.50
1 7	-1 -1	1935 1936	827.	* 7	1932	1162.	14.58
1 2 10	-ī	1937	1414.	* 8	1931	1247.	16.67
10	-1 -1	1938 1939	1952. 1775.	* 9 * 10	1940 1937	1323. 1414.	18.75 20.83
9	- i	1940	1323.	* 11	1961	1632.	22.92
8	-1 -1	1941 1942	2827. 4424.	* 12 * 13	1939 1970	1775. 1858.	25.00 27.08
9	-1	1943	4007.	* 14	1938	1952.	29.17
1	-1	1944	5141.	* 15	1960	1977. 2058.	31.25 33.33
9	-1 -1	1945 1946	5047. 3625.	* 16 * 17	1948 1956	2303.	35.42
8	-ī	1947	3625. 2923.	* 18	1967	2346.	37.50
10	-1 -1	1948 1949	2058. 2356.	* 19 * 20	1949 1959	2356. 2406.	39.58 41.67
9	-1	1950	3061.	* 20 * 21	1969	2406. 2464.	43.75
3 10	-1	1951 1952	4495. 3943.	* 22	1958 1964	2483. 2521.	45.83 47.92
10	-1 -1	1953	5235.	* 23 * 24	1764	2565.	50,00
8	-ī	1954	4430.	* 25	1962 1965	2565. 2638.	52.08
11	-1 -1	1955 1956	3856. 2303.	* 26 * 27	1941 1957	2827. 2843.	54.17 56.25
ŤŽ	~ī	1957 1958	2843.	¥ 28	1963	2904. 2923.	58.33 60.42 62.50
8	-1 -1	1958 1959	2483. 2406.	* 29 * 30	1947 1950	2923. 3061.	60.42 62.50
8	-1	1960	1977.	* 31	1971	3126.	64.58
1028 1883 10	-1 -1	1961	1632. 2565. 2904.	* 32 * 33 * 34	1974 1946	3196. 3625.	66.67 68.75
10	-1	1962 1963	2904.	* 34	1968	3813.	70.83
8	-1	1964	2521.	* 35	1955	3856.	70.83 72.92 75.00 77.08 79.17
3	-1 -1	1965 1966	2638. 4891.	* 36 * 37 * 38	1952 1943	3943. 4007.	77.08
39 10 29 9	-1	1967	2346.	* 38 * 39	1975	4007. 4228.	79.17
5	-1 -1	1968 1969	3813. 2464.	* 39 * 40	1942 1954	4424. 4430.	81.25 83.33
ģ	~ī	1970	1858.	* 41	1973	4442.	85.42
9 12	-1	1971	3126.	* 42	1951	4495.	87.50 89.58
7 9	-1 -1	1972 1973	7771. 4442.	* 43 * 44	1966 1945	4891. 5047.	91.67
ó	-i	1974	3196.	* 45	1944	5141.	91.67 93.75
é.	-1	1975	4228.	* 46	1953	5235.	95.83

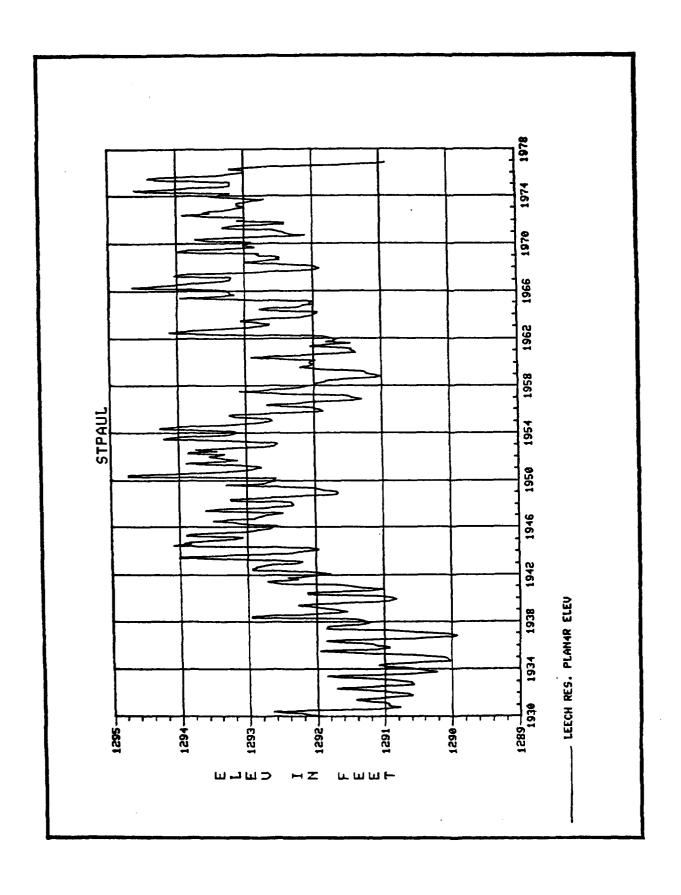
APPENDIX H

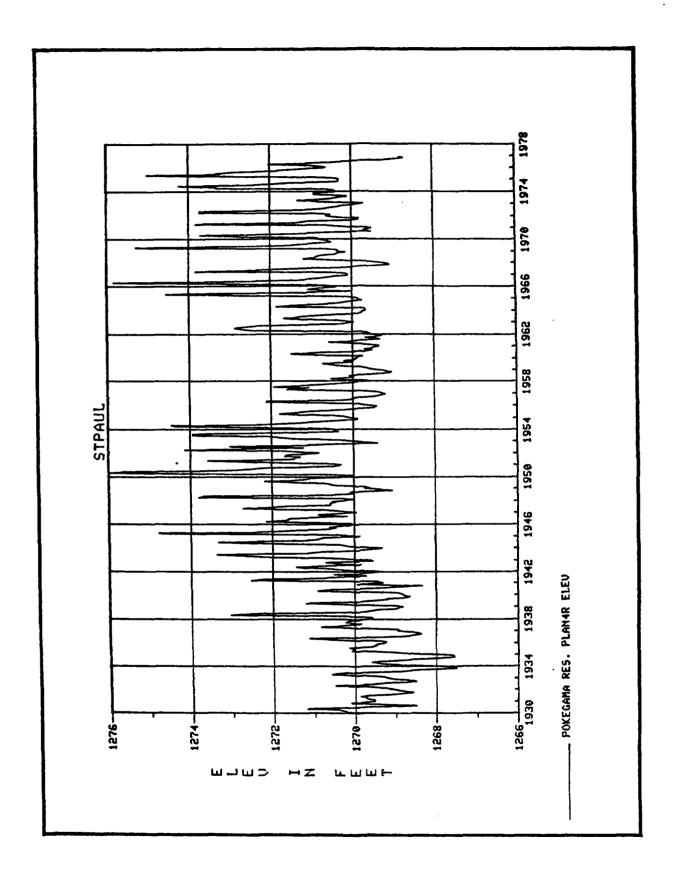
PLAN 4

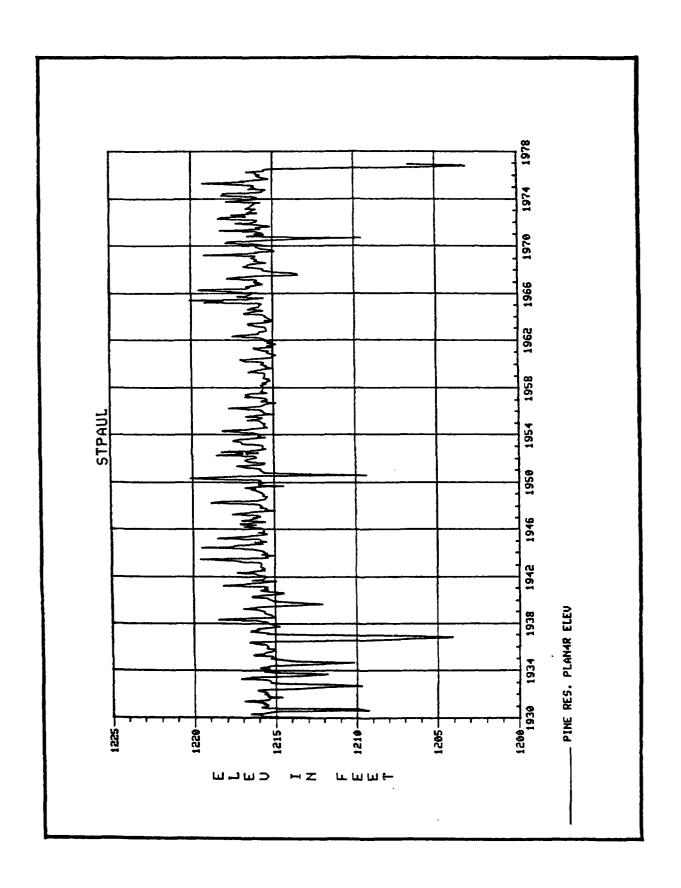
TIME SERIES DATA PLOTS
AND
ANNUAL MAX/MIN DATA TABLES

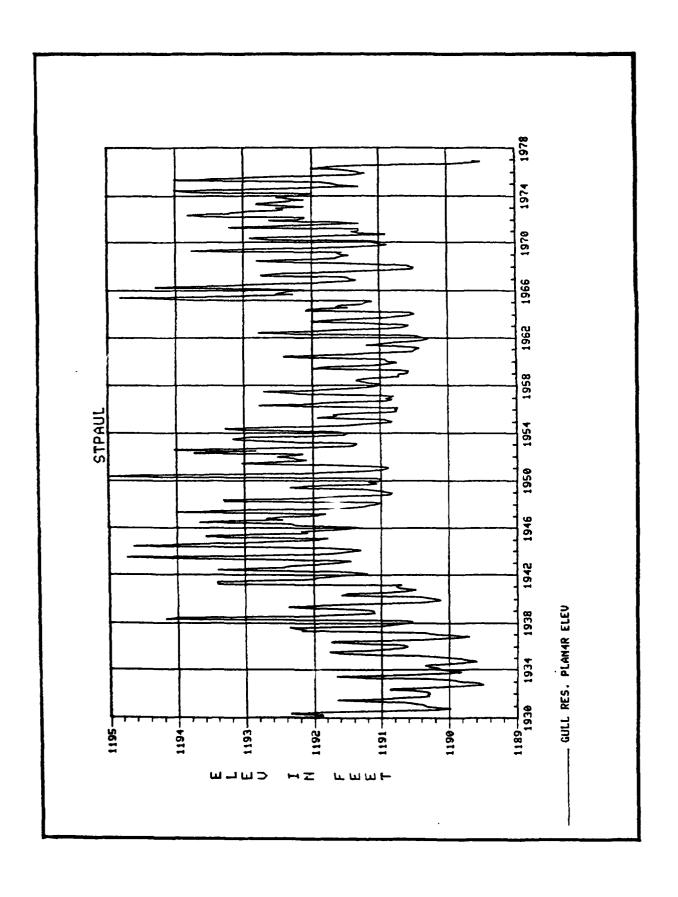
Note: The time series data plots in Appendices E through L are based on the complete period of record used in this study. The annual maximum and minimum data tables are only for the period of 1 May through 30 September for each year. The time series plot may have data values lower than those listed in the minimum data tables.

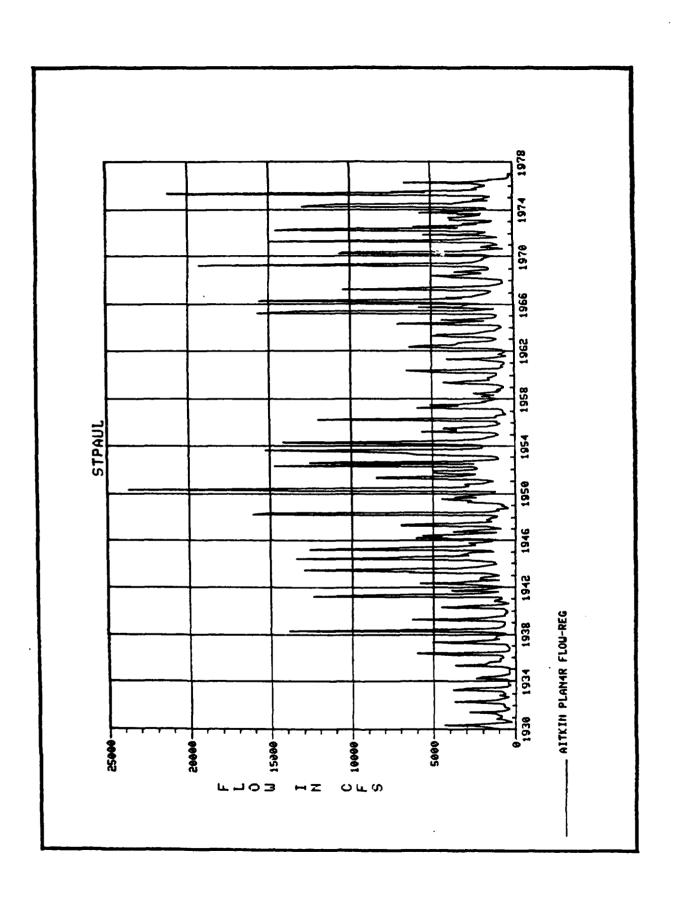


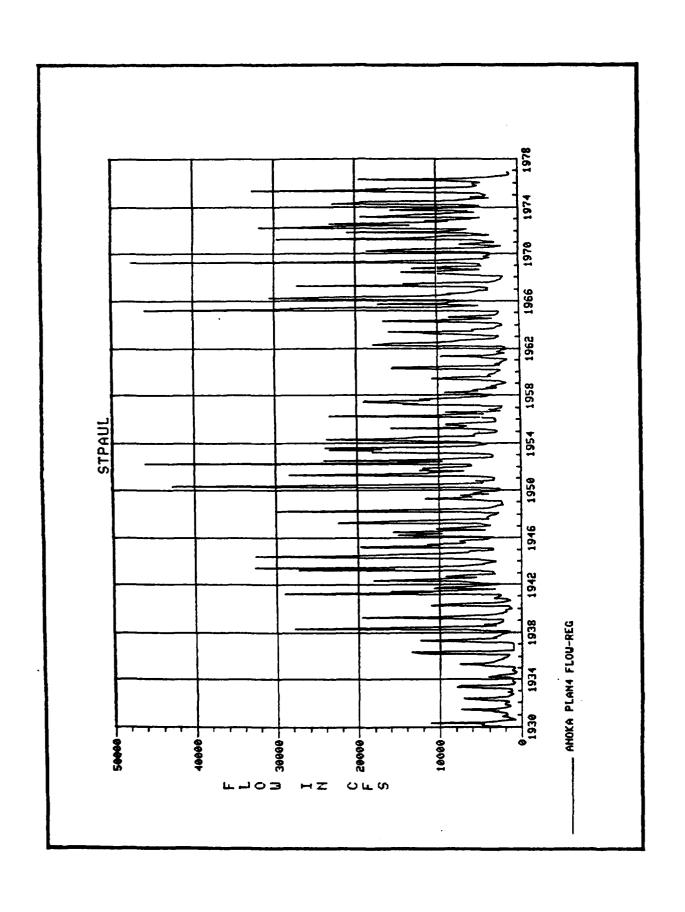












-PI OTTING	POSITIONS-	TRIVITLE	RESERVATE	FIFUATION

******	***************************************	** **
55555665 ***	6566676666666756658665866575757567666566	***
-1 -1 -1 -1 -1 -1 -1 ****	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	**** • • EVI
1969 1970 1971 1972 1973 1974 1975 1976	1123456789012345678901234567890123456789012345678901211995555666666668	*****
1290.2 1290.2 1289.7 1289.8 1288.4 1290.6 1290.6 1298.8	1288.3 1288.3 1288.3 1288.3 1288.1 1288.5 1288.5 1288.1 1288.1 1289.1 1290.1 1290.1 1290.1 1290.1 1290.1 1290.1 1288.3 1288.3 1289.1 1290.1 1290.1 1288.3 12	ONS- WINNI ******** ALYZED ELEV,FT.
******	- - - -	***
40 41 42 43 44 45 46 47 *****	123456789012345678901234567890123456789	******
1959 1960 1935 1939 1961 1931 1958 1934 *****	1994 1994 1994 1994 1994 1995 1995 1995	******
1288.2 1288.2 1288.1 1288.0 1287.9 1287.5 1287.5 1287.1 ********	12991.1 12991.1 12290.0 12290.	
83.33 * 85.42 * 87.50 * 89.58 * 91.67 * 93.75 * 95.83 * 97.92 * * * * * * * * * * * *		WEIBULL # PLOT POS #
		۱ ۱

_PLOTTING	POSITIONS-	MITNAT	RESERUNTR	FIFUATION
	PUBLICURAT	M 7 1414 1	RESLIVOIN	LLLVNJIJUN

*	****	K****	*****	*********** ^!	***	*****	*****	********* ERED EVENTS	******	*
***		DAY	YEAR	ELEV, FT.	*	RANK	WATER YEAR	ELEV,FT.	WEIBULL PLOT POS	* * *
***********	999995989999	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941	1287.0 1286.8 1286.5 1286.1 1286.1 1287.4 1288.0 1288.0 1288.0 1288.2	************	123456789011122	1934 1933 1931 1936 1936 1939 1932 1961 1958 1930 1940	1286.5 1286.5 1286.6 1286.7 1286.8 1286.8 1286.8 1286.9 1287.0	2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.67 18.82 22.92 25.00	***********
***	9 5 9	-1 -1 -1 -1	1942 1943 1944 1945	1298.2 1288.9 1288.5 1288.4	* * *	13 14 15 16	1956 1955 1938 1935	1287.3 1287.3 1287.4 1287.4	27.08 29.17 31.25 33.33	***

京 草 字 求 京 京 京 京 京 京 京 京 京 京 京 京 京 京 京 京 京 京	999599959995999599999999		194490123456789012345678901 19945555555555555666666678901 199555555555555666666678901	1287.6 1288.6 1288.1 1288.1 1288.1 1288.1 1288.1 1288.1 1287.1 1287.1 1287.1 1287.1 1287.1 1287.1 1288.8 1288.1 12	*****************	78901234567890123456789012	1946 1977 1976 1977 1976 1977 1976 1976 197	1287.6 1287.6 1287.6 1287.7 12887.7 12887.7 12887.7 122887.7 122888.1	420875320087532008753334445702468024680225779133455555555555555555555555555555555555	******************
*	799998999	-1 -1	1968 1969	1288.4 1288.5	*	39 40	1974 1966	1288.6 1298.6	81.25 83.33	********

***	宋宋市宋宋末末宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋 宋 宋宋末末末末
556	HON- 666657565667675765856575657586576665557555
-1 -1 -1	PAY
1972 1973 1974	Y- 11234567890123456789012345678901 1119733333334445678901234566666678901
1293.9 1293.1 1294.6	ELEV.FT. 1291.8 12991.9 122991.1 12991.1 12992.2 12992.1 1299
* * *	
43 44 45	RANK 123456789011234444
1933 1958 1932	WATER 195641954319644719643196421977461197773199447197794411977771994411993771994911993771994911993771994911993771994911993777388820411600999377
1291.8 1291.8 1291.7	ELE 1299444.000999987653322221111099987763210988 1299444.11000999987653322221111099987763210988 1229944.111112299333333333333333333333333333333
89.58 91.67 93.75	PLD 246.5587532087520875208752087520875208752087520875
***	***************************************

5996599959598599999999999999 **	***** MON 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
-1111-111-11-11-11-1-1-1-1-1-1-1-1-1-1	**** • • EVI
1955234567890123456789000000000000000000000000000000000000	k*****
1293.14 1293.33 12993.32 122993.12 1229971.12 122991.12 122993.12 122992.13 122992.13 122992.13 122992.13 12299.13 12299.13 12299.13 12299.13 12299.13 12299.14 12299	ELEV,FT. 1291.0 1290.8 1290.7 1290.0 1291.2 1291.6 1291.9 1291.2 1292.5 1292.5 1292.7 1292.7
***************************************	***
0123456789012345678901234567* ***********************************	*****
194415 1957128377473956315965774563159654230222456**	****
122334555556778991112233345778 12279222222222233345778 1227922222222222333333333333333333333333	ELEV, FT. 1290.1 1290.3 1290.7 1290.8 1291.2 1291.2 1291.4 1291.6 1291.6 1291.6 1291.8 1291.9 1292.2
413	**************************************
*******************	۲ لا

				ONS- POKE				EVATION *******	****
1	K			ALYZED	*	* * * * * * * * *	····ORD	ERED EVENTS	, , , , , , , , , , , ,
1	HON	DAY	YEAR	ELEV,FT.	*	RANK	WATER YEAR	ELEV, FT.	WEIRULL PLOT POS
X		-1 -1	1930 1931	1271.2 1269.8	x *	1	1950 1966	1275.9 1275.8	2.08 4.17
*	5	-1	1932	1270.5	*	1 2 3	1969	1275.3	6.25
X	5	-1 -1	1933 1934	1270.6 1269.6	*	4 5	1975 1965	1275.0 1274.5	8.33 10.42
1	ğ	-ī	1935 1936	1270.1 1271.1	*	5 6 7	1954 1974	1274.4 1274.2 1273.9	12.50 14.58
) }	5	-1 -1	1937	1270.8	*	8	1953	1273.9	16.67
k	5	-1 -1	1939 1939	1273.0 1270.7	*	9 10	1972 1948	1273.7 1273.7	10.42 12.50 14.58 16.67 18.75 20.83
*	5	-1	1940	1270.9	*	11	1970	1273.7	20.83 22.92
k	6	-1 -1 -1	1941 1942 1943	1272.2 1271.4	*	12 13	1971 1951	1273.6 1273.6	25.00 27.08
*	6 7	-1 -1	1943 1944	1777.4	*	14 15	1943 1944	17/4.4	27.08 29.17 31.25
4	្ន	-1 -1	1945	1272.5	*	16 17	1952	1273.3 1273.3	33.33 35.42 37.50
ķ	5	-Ī	1946 1947	1273.3 1272.5 1271.6 1272.7 1273.7	*	18	1938 1967	1273.0 1273.0 1273.0 1272.9	33.33 35.42 37.50
k k	5 8	-1 -1	1948 1949	1273.7 1272.2	*	19 20	1962 1947	1272.7	39.58 41.67
1	Ş	- <u>i</u> -1	1950	1275.9	*	21	1945	1272.5 1272.2	43.75
x x	5	-1	1951 1952	1273.6 1273.3	*	21 22 23	1949 1941	1272.2	47.92
*	7	-1 -1	1953 1954	1273.9 1274.4	*	24	1956 1957	1272.1 1271.9	50.00 ×
- 1	รู้	-1	1955	1271.8	*	25 26 27	1964	1271.8 1271.8	52.08 54.17 56.25 58.33
*	7	-1 -1	1956 1957	1272.1 1271.9 1270.1	*	28	1955 1963	1271.7	56.25 58.33
*	7	-1 -1	1958 1959	1270.1 1270.7	*	29 30	1946 1960	1271.6 1271.5	60.42 62.50
*	Ş	- <u>ī</u>	1960	1270.7 1271.5	*	31	1942	1271.5 1271.4 1271.3	64.58
*	7	-1 -1	1961 1962	1270.5 1272.9 1271.7	*	32 33 34	1976 1930	1271.2	64.58
*	5	-1 -1	1963 1964	1271.7 1271.8	*	34 35	1968 1936	1271.2 1271.1	70.83 x
*	ร	-1	1965	1274.5	*	36	1940	1270.9	72.92 75.00 77.08
*	5	-1 -1	1966 1967	1275.8 1273.0	*	37 38	1937 1973	1270.8 1270.8	/Y+1/ X
*	_	-1 -1	1968 1969	1271.2 1275.3	*	39 40	1959 1939	1270.7 1270.7	81.25 x 83.33 x
*	5	-1	1970	1273.7	*	41	1933	1270.6	85.42 ×
*	5	-1 -1	1971 1972	1273.6 1273.7	*	42 43	1961 1932	1270.5 1270.5	87.50 x
*		-1	1973	1270.8	*	44	1935	1270.1	91.67

*	6	-1	1974	1274.2	*	45	1958	1270.1	93.75	*
*	_		1975	1275.0	*	46	1931	1269.8	95,83	*
*	5	-1	1976	1271.3	*	47	1934	1269.6	97.92	*
**	****	***	******	*******	***	*****	******	******	*******	**

- APMLYCIS OF NIGHTHS -

*******************	******************	*
965999999999999999999 **	HON 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	***
	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	****
19555555555555555555555555555555555555	ENTS AN YEAR - 193123345671933567193391194451944519449119449	******
1271.9 1271.9 12770.0 12770.0 12770.1 1270.0 1270.1 1270.0 1270.0 1270.1	1268.5 1268.8 1268.8 1268.5 1268.6 1269.5 1269.5 1269.5 1269.7 1269.8 1270.8 1270.4 1270.2 1270.5 1270.6	ONS- POKE
************************	***********************	***
23456789012345678901234567 22222233333333344444567* ***	RANK 1234567890112345678901123115678901	******
1955 1955 1955 1967 1964 1964 1964 1964 1964 1975 1964 1975 1975 1975 1975 1975 1975 1975 1975		*****
1270.0 1270.0 1270.0 12770.0 12770.3 12770.3 12770.5 12770.8 12770.8 12770.8 12770.8 12770.8 12771.5 1	ELEV, FT. 1268.0 1268.5 1268.5 1268.8 1268.1 1269.1 1269.2 1269.3 1269.5 1269.8 1269.8 1269.8 1269.8	电容差状态差差未来电差
\$2087532087532087532 \$7.0012345875320875322 \$5.67875320875322 \$4.55556624.0015322 \$4.55556666660.0015322 \$4.555567532 \$4.555567532 \$4.555567532 \$4.55567532 \$4.55567532 \$4.55567532 \$4.55567532 \$4.55567532 \$4.5567532 \$4.5567532 \$4.5567532 \$4.5567532 \$4.5567532 \$4.5567532 \$4.5567532 \$4.5567532 \$4.556753 \$4.556753 \$4.55675 \$4.55	PLOT F09 2.125-08 46.23220 10.5587 10.5587 10.5587 12.5587 12.5587 12.5587 12.5587 12.5587 13.55.5587 13.55.5587 14.6675 15.675 16.675 16.675 16.675 16.675	****
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	****	**** • EVE	*****		***	*****	****	ION ********** ERED EVENTS ELEV,FT.	WEIBULL :
*******	5 45555555	-1 -1 -1 -1 -1 -1 -1	1930 1931 1932 1933 1934 1935 1936 1937 1938	1216.5 1216.9 1216.1 1217.1 1215.4 1216.3 1216.5 1216.5	****	1 2 3 4 5 6 7 8 9	1950 1965 1943 1944 1966 1975 1938 1948 1952	1220.1 1220.0 1219.6 1219.4 1219.4 1218.5 1218.3 1218.1	2.08 4.17 6.25 9.33 10.42 12.50 14.58 16.67 18.75

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*****	いいいいかるいい	-1 19 -1 19 -1 19 -1 19 -1 19 -1 19 -1 19	970 971 972 973 974 975	1217.7 1217.1 1218.1 1218.3 1218.0 1218.6 1218.5	* * * * * *	41 42 43 44 45	1935 1961 1939 1932 1958 1976 1974	121 121 121 121 121 121 121	6.3 6.1 6.1 5.7 5.5	85.42 87.50 89.58 91.67 93.75 95.83 97.92	******

水水 宋宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋	·_
MON 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	PLOT
**E A	TING
*** Y 111111111111111111111111111111111	POSITI
	ONS- PINE
	RE
RANK	SERVOIR
**·W	ELEVAT
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***• US	
法 月末 水青 古 共 为 1 年 宋 章 章 章 章 章 章 章 章 章 章 章 章 章 章 章 章 章 章	

		POSITIONS-	CHILL	DECEDUATO	CLEUATION
-E-1	NTTTNG.	PUSTATIONS-	BULL	RESERVUIR	ELEVALIUN

**	k***	***	*****	*****	**:	******	*****	********** ERED EVENTS	*****	**
*	• • • •	DAY	YEAR	ELEV,FT.	**	RANK	WATER YEAR	ELEV,FT.	WEIBULL PLOT POS	**
***********	5756575855	-1 -1 -1 -1 -1 -1 -1 -1	1930 1931 1932 1933 1934 1935 1936 1937 1938 1939	1192.3 1191.6 1190.9 1191.6 1190.3 1191.8 1191.7 1192.3	**********	1 2 3 4 5 6 7 8 9 10	1950 1965 1943 1944 1966 1938 1952 1947 1975	1195.0 1194.8 1194.7 1194.6 1194.3 1194.2 1194.0 1194.0 1194.0	2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.75 20.83	****
***	8555 5	•	1938	1194.2	***	8 9 10 11	1975	1194.0	18.	75 83

*	5	-1	1941	1193.4	*	12	1969	1193.8	25.00 *
*	6	-1	1942	1193.4	*	12 13	1946	1193.6	27.08
×	566657	-ī	1943	1194.7	*	14	1945	1193.6	29.17 *
×.	ě	-ĩ	1944	1194.6	*	15	1941	1193.4	31.25 *
*	5	-ī	1945	1193.6	*	16	1942	1193.4	33.33 *
*	7	-ī	1946	1193.6	*	16 17	1948	1193.4 1193.3	35.42 *
*	5	-1	1947	1194.0	*	18	1954	1197.7	37.50 *
*	5	-ī	1948	1193.3	*	19	1971	1193.2	39.58 *
*	6	-1	1949	1192.3	*	20	1953	1193.2	41.67 43.75
*	5	-1	1949 1950	1192.3 1195.0 1193.0	*	21	1953 1951 1970	1193.2 1193.2 1193.0 1192.9	41.67 * 43.75 *
*	6	-1	1951	1193.0	×	22	1970	1192.9	45.83 *
*	8	-1	1952	1194.0	*	23	1968	1197.8	47.92 *
*	7	-1	1953	1193.2 1193.3	*	24	1973	1172.8	50.00 * 52.08 *
*	6	-1	1953 1954 1955	1193.3	×	25	1762	1192+8	52.08 ×
*	Ž	-1	1955	1191.9	¥	26	1968 1973 1962 1956 1967	1192.8 1192.8 1192.8 1192.7	54.17 * 56.25 *
*	ž	-1	1956	1192.8	*	2/	170/	1172.7	30.43 A
*	′,	-1	1957	1192.7 1191.3	Ŧ	28	1957 1960	1192.7 1192.4	58.33 * 60.42 *
*	9	-1 -1	1958 1959	1192.0	*	27 70	1939	117214	62.50
*	5	-1	1960	1192.4	*	22223456789901	1937	1192.3 1192.3	64.58 *
*	ž	-i	1961	1191.2	¥	32	1930	1192.3	44.47 ¥
Ť.	ž	-i	1962	1192.8	ž	32 33	1949	1192.3 1192.3	66.67 * 68.75 *
1	ă	-ī	1963	1192.0	*	34	1964	1192.1	70.83 *
¥	Š	-ī	1964	1192.1	************	35	1963	1192.0	72.92 *
×.	6	-1	1965	1194.8	*	36	1959	1192.0	75.00 *
*	5	-1	1966	1194.3	*	36 37	1955	1191.9	77.08 *
*	5	-1	1967	1192.7	*	38	1976	1191.9	79.17 *
*	7	-1	1968	1192.8	*	39	1935	1191.8	81.25 *
*	5	-1	1969 1970	1193.8 1192.9	*	40	1936	1191.7 1191.6 1191.6	83.33 *
*	5	-1	1970	1192.9	¥	41	1933	1171.6	85.42 * 87.50 *
*	5	-1	1971	1193.2	Ŧ	42	1931	1171.6	87.50 #
*	55656876557665566555755555555	-1	1972	1193.8	****	43	1940	1191.6	5555602.4555602.45555602.4555602.45556008.75555602.45556008.75555602.45556008.7757779.1555605.775779.1555605.77555605.775779.1555605.77555605.775779.1555605.77555605.775779.1555605.77555605.775779.1555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.77555605.7755605050505050505050505050505050505050
*	Ž	-1 -1	1973 1974	1192.8 1194.0	∓	44 45	1958 1961	1191.3 1191.2	91.67 * 93.75 *
不	Ş	-1	1975	1194.0	*	46	1932	1190.9	95.83 *
*	Ę	-1	1976	1191.9	*	47	1934	1190.3	97.92
	****	* * * * 1	*****	*****	k # #	*****	****	******	******

- AMALYSIS OF HIMIHUMS -

-FI OTTING	FUSITIONS-	CHILL	PECEDINIE	FIGUATION

	- CUI	****		.UNS- GULL	17	SEKVUIK	ELEVAI	**********	. به داد به به به باد به باد باد باد باد باد باد	
1				ALYZED	• * *	*****				*
3	: · · · ·	• • E V	TIK I D HIN	HE I ZED	* * *	; • • • • • • • • • • • • • • • • • • •	WATER	ERED EVENTS	10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	¥.
3	หกม	DAY	YEAR	ELEV,FT.	*	RANK	YEAR	ELEV,FT.		*
3	110K		I E MIN	CLEVIII.	. . *	' MARIN	ICHK	ELEVIEI.	LLUI FUS A	*
ĸ	9	-1	1930	1190.2	*	1	1934	1189.6	2.08	
1		-i	1931	1190.7	*	1 2	1932	1189.7		*
i	_	-1	1932	1189.7	*		1976	1190.0		
i		-1	1933	1190.1	*		1936	1170.0		*.
		-1	1934	1189.6			1933			*
*					*			1190.1	10.42	ķ
	. 7	-1	1935	1191.2	*		1930	1190.2		*
4		-1	1936	1190.1	*		1961	1190.5		ķ
į	9	-1	1937	1191.6	*		1940	1190.6	16.67	ł.
ķ		-1	1938	1191.6	*	9	1931	1190.7 1190.8		ķ
k k		-1	1939 1940	1190.8	*		1939 1970	1170.8	20.83	ķ
	, 7	-1 -1	1941	1190.6		11		1190.9	22.92	ķ
¥	, 7			1192.0	*		1958 1960	1190.9	25.00	
*	7	-1 -1	1942 1943	1172.4	*	13		1121.1	25.00 1 27.08 1 29.17 1	
*	7	-1	1944	1192.4 1192.3 1192.7	*		1959	1191.1 1191.1	29.17	
*		-1	1945	1174+/			1967		31.25	
*	. 5	-1	1946	1192.1	×		1969	1191.1	33.33 *	
*		-1	1947	1192.3 1191.6	*	17 18	1949 1963	1171.2	35.42 * 37.50 *	
*		-i	1948	1191.5	*	19	1935	1191.2 1191.2 1191.2	37.50 * 39.58 *	
×	Ó	-i	1949		*	żó	1971	1191.3		
*	•	-i	1950	1191.2 1191.5	*	21	1956	1171.3	41.67 * 43.75 *	
*		-i	1951	1192.1	*	20 21 22	1955	1191.4	45.83	
×	6	-ī	1952	1192.1 1192.8	*	23	1964	1191.5	47.92 *	
*		-ī	1953	1192.4	*	24	1954	1191.5	50.00 *	
*	ġ	-ī	1954	1191.5	*	25	1950	1191.5	52.08	
*	9	-ī	1955	1191.4	*	25 26	1962	1191.5	54.17	
*		-ī	1956	1191.3	*	27	1948	1191.5	56.25 *	
*	9	-1	1957	1191.6	×	28	1947	1191.6	58.33 *	
*		-Ī	1958	1190.9	*	29 30	1938	1191.6	60.42 *	
*	9	-1	1959	1191.1	*	30	1968	1191.6	62.50 *	
*	9	-1	1960	1191.1	*	31	1957	1191.6	64.58 *	
*	9	-1	1961	1190.5	*	32	1937	1191.6	66+67 *	!
*	9	-1	1962	1191.5	*	33 34	1975	1191.9	68.75 *	:
*	Ž	-1	1963	1191.2	*	34	1966	1191.9	70.83 *	
*	8 9	-1	1964	1191.5	*	35	1974	1191.9	72.92 *	
*		-1	1965	1192.3	*	36	1941	1192.0	75.00 *	
*	9 9	-1 -1	1966	1191.9	*	37 38	1945	1192.1	77·08 *	
*	9	-1	1967 1968	1191.1	*	సైద్ధ	1951	1192.1	79.17 *	
*	ý	-1	1969	1191.6 1191.1	*	39 40	1973	1192.1	81.25 *	
Ĩ	ģ	-1	1970	1191.1 1190.9	*		1965 1943	1192.3	83.33 *	
×	9	- <u>1</u>	1971	1191.3	*	41 42	1943	1192.3 1192.3	85.42 * 87.50 *	
*	ģ	-1	1972	1192.9	*	43	1953	1172.3	87.50 * 89.58 *	
*	ģ	-1	1973	1192.1	*	44	1942	1192.4	91.67	
X	ģ	-1	1974	1191.9	*	45	1944	1192.7	:	
ž	ģ	- <u>i</u>	1975	1191.9	*	45 46	1952	1172.7	93.75 * 95.83 *	
×	ģ	- i	1976	1190.0	*	47	1972	1192.9	97.92 *	
*								*********	**************************************	
			* 4- 4- 4- 4- 4- 4- 4- 4- 4- 4- 4- 4- 4-	ن بن	-4- ·4, ,	and the chief of the chief	ار بوان دان دان دان داد. د	աստուսարտաստությանը,	t. t. t. d. d. d. d. d. d. d. d.	

-PLOTTING	POSITIONS-	ATTKIN	FLOW

			PUSITI	UNS- AITKIN **********	–				and the street street in	
*				ALYZED	***	****		ERED EVENTS		Ŧ ¥
***	нон		YEAR	FLOW, CFS	**	RANK	WATER YEAR	FLOW, CFS	WEIRULL >	*
***	5 6	-1 -1 -1	1930 1931 1932	4275. 2810. 3688.	*	1 2 3	1950 1975 1969	23595. 21177. 19236.	2.08 4.17 6.25	*
***	655 4	-1 -1	1933 1933 1934	3787. 2367.	* * *	3 4 5	1707 1948 1965	16001. 15605.	8.33	Ť ¥ Å.
**	5	-1 -1	1935 1936	3638. 5955.	*	6 7	1966 1953	15554. 15215.	7 2 1 2 7	i
*	5	-î -1	1937 1938	5034. 13814.	*	8 9	1971 1952	14841. 14628.		K
* *	りいりいりょい	- <u>i</u> -1	1939 1940	6245. 4466.	*	10 11	1972 1954	14529. 14140.	20.83 22.92	•
* *	4	-1 -1	1941 1942	12336. 5783.	*	12 13	1938 1944	13814. 13345.	25.00 1 27.08 2	k K
*	6	-1 -1	1943 1944	12893. 13345.	*	14 15	1943 1974	12893. 12868.	29.17 1 31.25 1	k K
*	3	-1 -1	1945 1946	12519. 6023.	*	16 17	1945 1941	12519. 12336.	33.33 × 35.42	k K
***	4	-1 -1 -1	1947 1948 1949	6890. 16001. 4446.	* *	18 19 20	1956 1970 1967	12002. 10566.	37.50 39.58 41.67	
**	4 7 5 4	-1 -1	1950 1951	23595. 8377.	* *	21 22	1951 1964	10335. 8377. 7025.	41.67 4 43.75 4 45.83 4	
**	4 8	- <u>i</u> -i	1952 1953	14628. 15215.	* *	21 22 23 24	1947 1976	6890. 6569.	47.92 50.00	ķ ķ
*	5 4	-1 -1	1954 1955	14140. 5605.	*	25 26 27	1960 1962	6471. 6366.	52.08 1 54.17 1	K K
* *	4	-1 -1	1956 1957	12002. 5860.	*	27 28 29	1939 1946	6245. 6023.	56.25 × 58.33 ×	k
* * *	7 6 5 5	-1 -1 -1	1958 1959 1960	2419. 4255. 6471.	* * *	30 31	1936 1957 1942	5955. 5860. 5783.	60.42 1 62.50 1 64.58 1	k
**	5	-i -1	1961 1962	4080. 6366.	*	32 33	1973 1955	5644. 5605.	66.67 X	
*	5 4 5	- <u>i</u> - <u>i</u>	1963 1964	4870. 7025.	*	34 35	1937 1963	5034. 4870.	70.83 × 72.92 ×	ŗ Ķ
*	4	- <u>1</u>	1965 1966	15605. 15554.	*	36 37	1968 1940	4869. 4466.	75.00 1 77.08 1	K K
***	4 6 4	-1 -1 -1	1967 1968 1969	10335. 4869. 19236.	* * *	38 39 40	1949 1930 1959	4446. 4275. 4255.	79,17 81,25 83,33	k K
**	4	-1 -1	1970 1970 1971	19236. 10566. 14841.	* *	41	1961 1933	4080. 3787.	85.42 87.50	ķ
*	10	-1 -1	1972 1973	14529. 5644.	* *	42 43 44	1932 1935	3688. 3638.	89.58 * 91.67 *	K
*	4	-1	1974	12868.	*	45	1931	2810.	93.75 *	

-DIOTTING	POSTTIONS-	AMORA	FLOU
-61 111 1 1015	FUNITURE -	ANIINA	FI IIW

**	(***)			********** ALYZED					*****	**
* *	мом		YEAR	FLOW, CFS	* * RA	WA	TER		PEIRULL PLOT POS	**
******	8 9 10 9 8 1 7	-1 -1 -1 -1 -1 -1	1930 1931 1932 1933 1934 1935 1936 1937	783. 1319. 1043. 743. 547. 792. 888. 1004.	* * * * * * * * * * * * * * * * * * *	2 1 3 1 5 1 6 1 7 1	934 933 930 935 936 976 937 932	547. 743. 793. 792. 888. 1004. 1004.	2.08 4.17 6.25 8.33 10.42 12.50 14.58	******
*	12 12	-î -1	1938 1939	1355. 1614.	* * 1	9 1	940 931	1123. 1319.	18.75 20.83	*

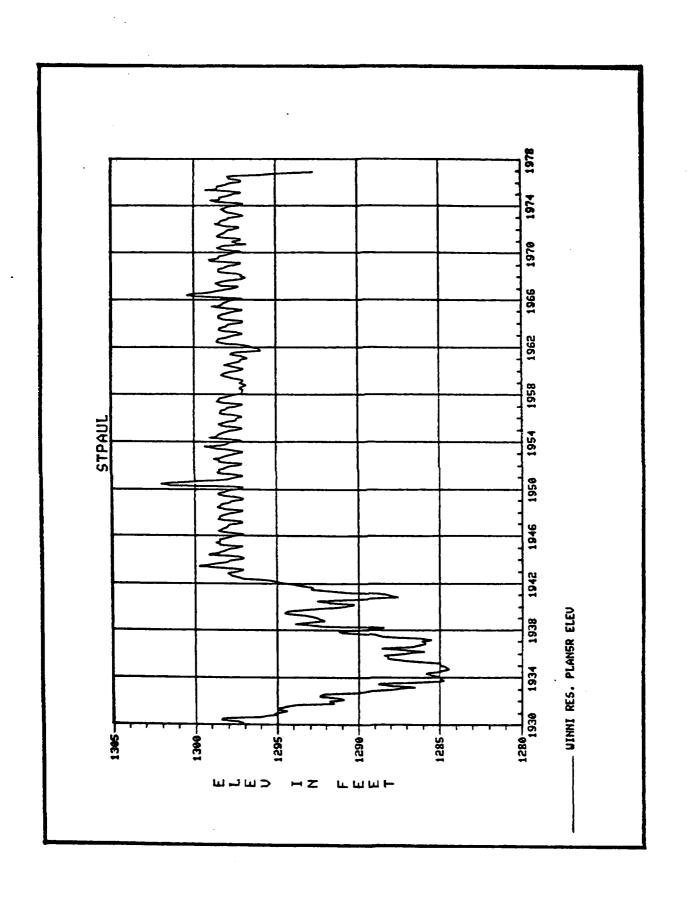
*	1	-1	1940	1123.	*	11	1938	1355.	22.92
*	1 2 1	-1 -1	1941 1942	2406. 2557.	*	12 13	1961 1939	1499. 1614.	22.92 25.00 27.08
*	12	-1	1943	3205,	*	14	1959	1674.	29.17 31.25 33.33
×	112220121212121212121212121212121212121	-1 -1	1944 1945	3044. 3380.	*	15 16	1962 1960	1744. 1748.	31.25
*	2	-1	1946	3312.	*	17	1968	1937.	35.42
*	12	-1 -1	1947 1948	3717.	*	18	1970 1964	2017.	37.50 3 39.58
*	ĭ	-1 -1	1949	2189. 2291.	*	19 20	1957	2017. 2022. 2135.	41.67
*	2	-1	1950	2560.	*	21	1957 1967	2144.	43.75
X X	12	-1 -1 -1	1950 1951 1952	3054. 3306.	*	22	1948 1963	2144. 2189. 2263.	45.83 47.92
*	1	-ī	1953 1954	3347.	*	21 22 23 24	1958	2266. 2291.	50.00 7
*	12	-1 -1	1954	3048. 2765.	*	25 26	1949 1956	2291. 2335.	52.08 × 54.17
*	10	- <u>1</u>	1955 1956	2335.	*	27	1941	2406.	56.25
*	2	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	1957	2135. 2266.	*	28	1965	2411.	58.33
¥	12	-1 -1	1958	2266. 1674.	*	29 30	1942	2557. 2540.	60.42 62.50
*	12	- i	1960	1748.	*	30 31 32 33	1950 1955 1971	2560. 2765. 2892. 3044.	64.58
*	1	-1	1961	1499.	*	32	1971 1944	2892.	66.67 68.75
*	12	-1	1957 1958 1959 1960 1961 1963 1965 1965 1966 1967	1748. 17499. 17494. 226221. 2698. 21417. 36944. 1937. 3417. 3417. 2892.	*	34	1951	3054.	70.83
*	2	-1	1964	2022.	*	35 36 37	1954	3054. 3068. 3205. 3306. 3312.	70.83 72.92 75.00 77.08
*	12	-1	1966	3698	*	30 37	1943 1952	3205. 3306.	75.00 77.08
*	12	-1	1967	2144.	*	38	1946	3312.	/9+1/
*	1 9	-1 -1	1968 1969 1970	1937.	*	39 40	1953 1945	3347. 3380. 3413. 3502.	81.25 83.33 85.42
*	ģ	-1	1970	2017.	*	41	1969	3413.	83.33 85.42
¥	1 2	-1	1971	2892.	*	42 43	1969 1974	3502.	87.50
*	9 1 12 2 10	-1	1971 1972 1973	5741. 4689.	*	43 44	1966 1947	3698. 3717.	91.67
*	10	-1	1974	3502.	*	45	1975	3871.	93.75
*	1	-1 -1	1975 1976	3871.	*	46	1973	4689. 5741.	95.83 97.92
*	10	****	1976	1004.	***	47	1972		7/•7 <u>2</u> *********

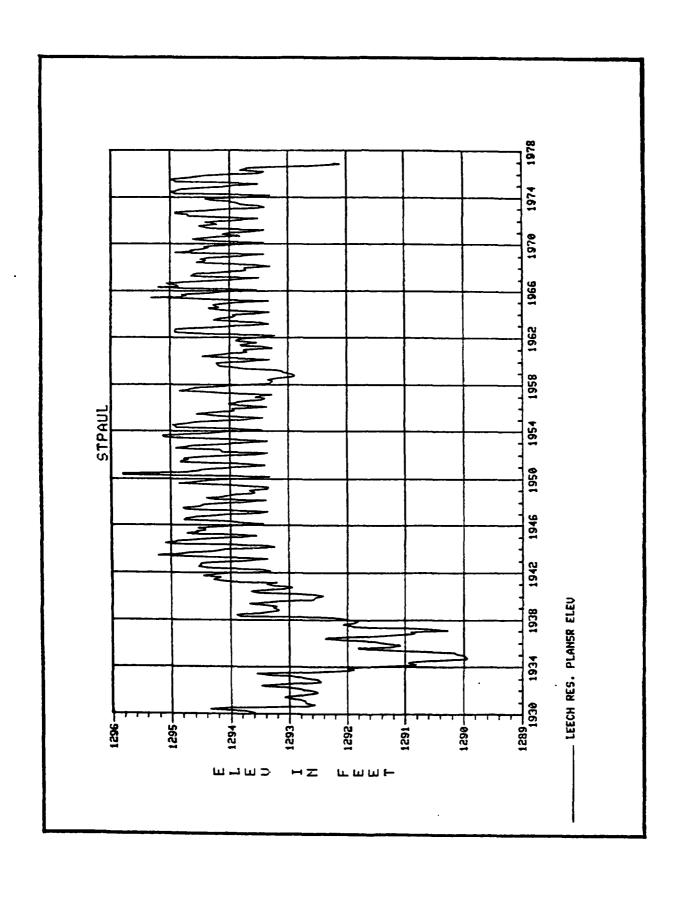
APPENDIX I

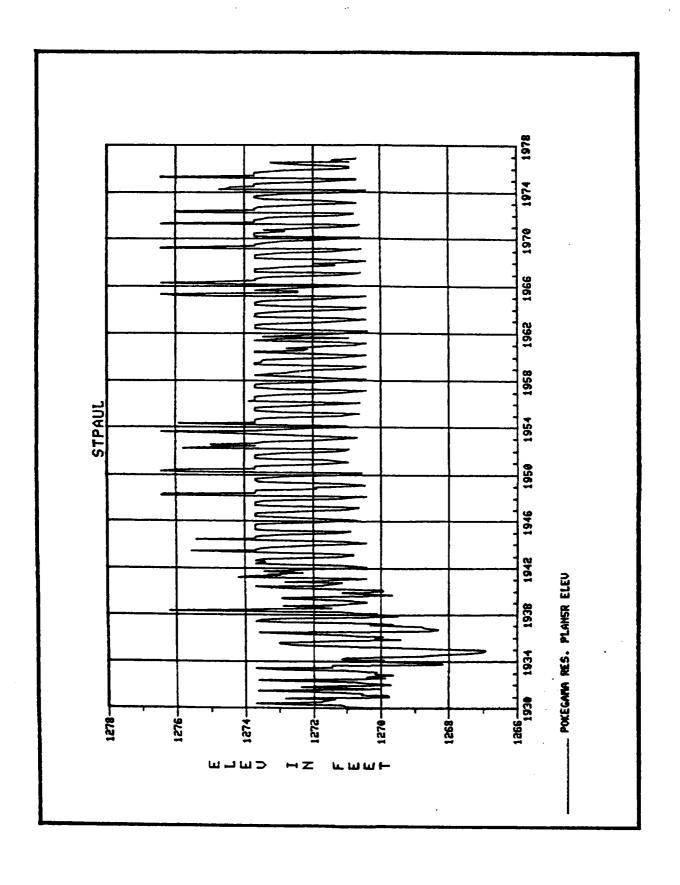
PLAN 5

TIME SERIES DATA PLOTS
AND
ANNUAL MAX/MIN DATA TABLES

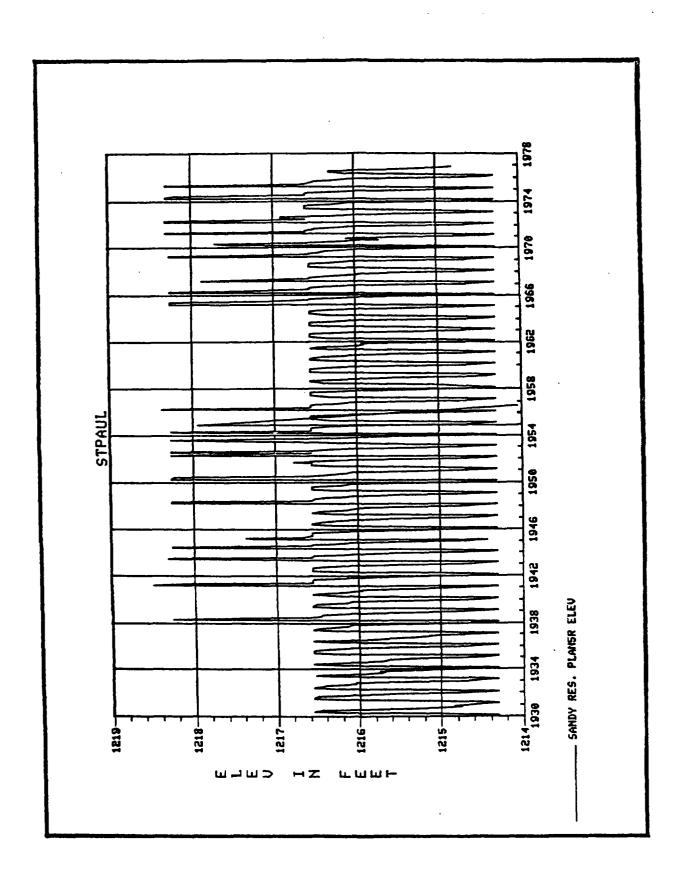
Note: The time series data plots in Appendices E through L are based on the complete period of record used in this study. The annual maximum and minimum data tables are only for the period of 1 May through 30 September for each year. The time series plot may have data values lower than those listed in the minimum data tables.

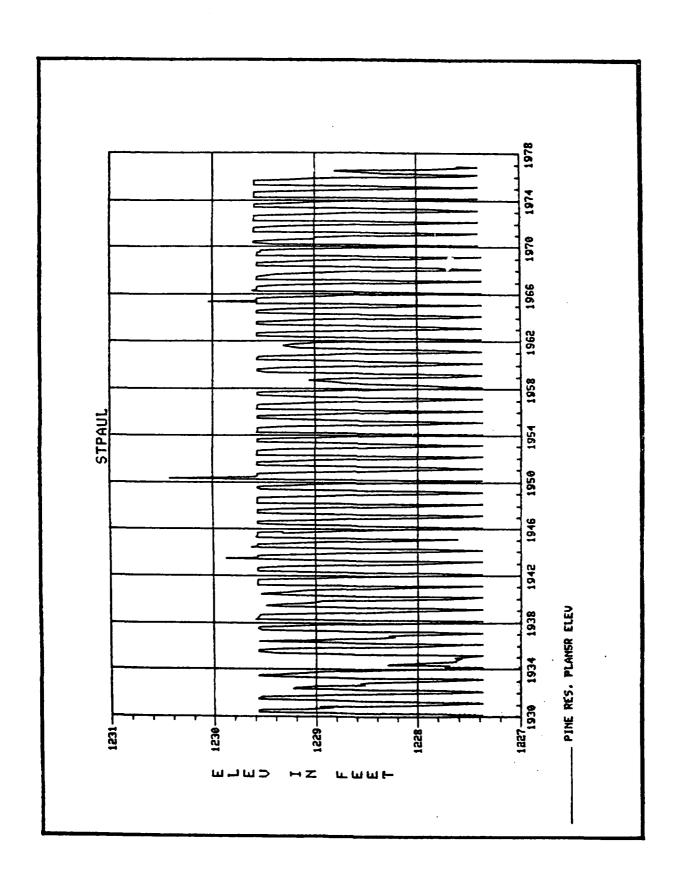


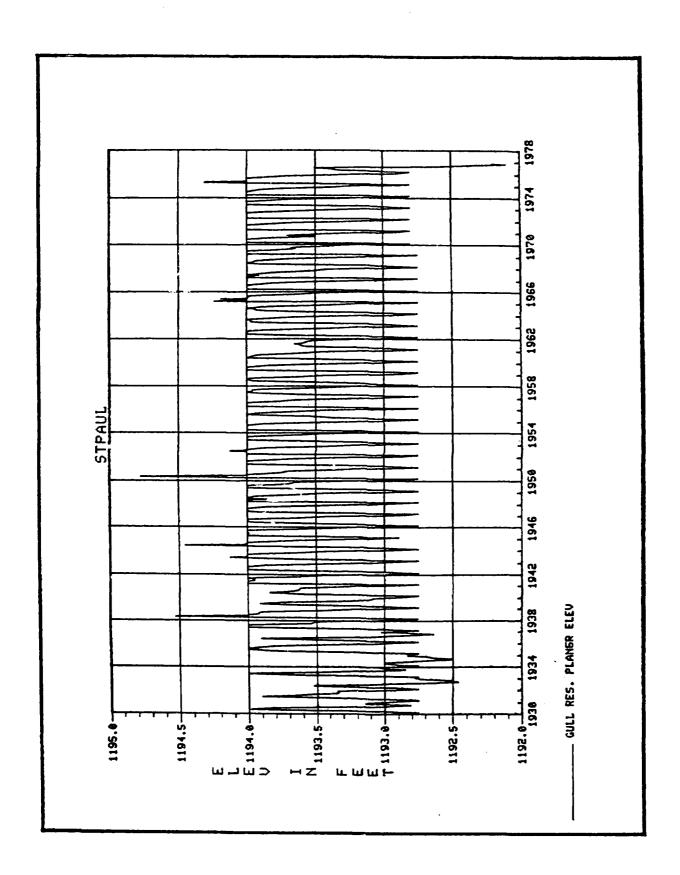




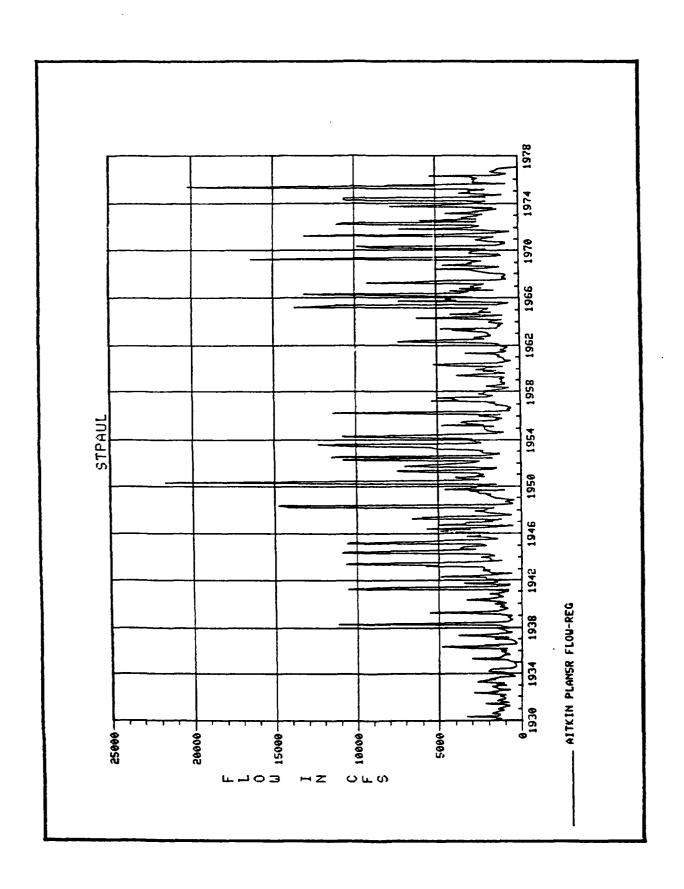
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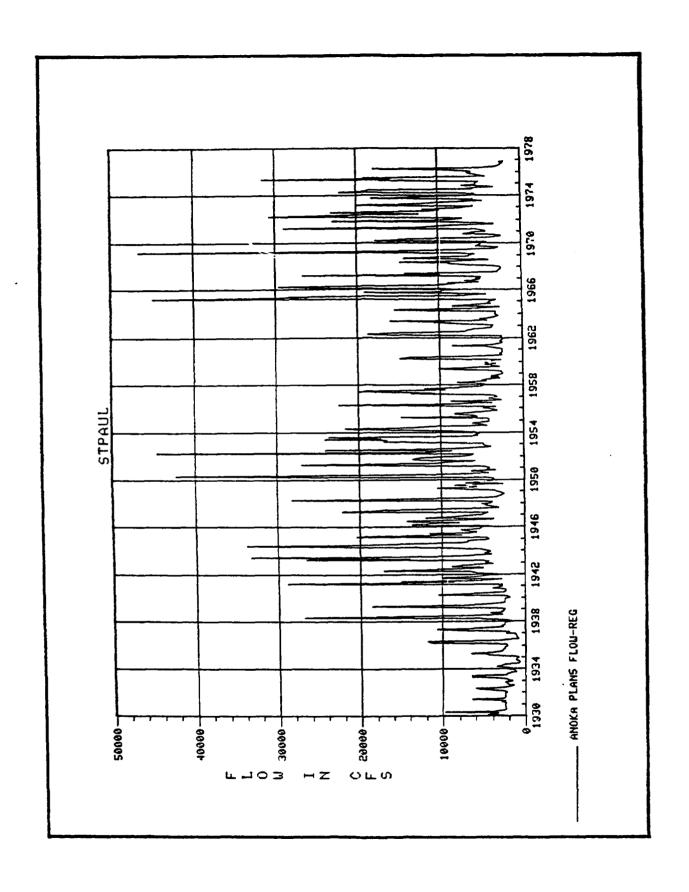






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66669655**	657658697777996666668866885666797677666666	***
-1 -1 -1 -1 -1 -1 -1 ***	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	***
1969 1970 1971 1972 1973 1974 1975 1976 *****	19933334567890112334567890123345678901233456789012334567890123456789012345678	*****
1299.0 1298.5 1298.5 1298.6 1298.3 1298.9 1299.2 1297.8 *******	12984.47 12984.47 122985.58 122985.58 1229888.55 122999998.88 12299999888.55 12299999888.55 12299998888.67 122998888.64 122998888.67 122998888.64 122998888.64 122998888.64 122998888.64 122998888.64 1229988888.64 122998888888888888888888888888888888888	ONS- WINN ******** ALYZED ELEV,FT.
******	*****************************	I RE **** * * *
40 41 42 43 44 45 46 47 ******	12345678901234567890123456789	ESERVOI ******* RANK
1941 1940 1932 1937 1933 1936 1935 1934 *****	19564335 19564335 1957444 1956745 19765 19765 19765 19765 19765 19766 1976 1976 1976 1976 1976 1976 197	******* ••••ORDI WATER
1292.9 1292.5 1292.4 1289.8 1288.7 1288.5 1288.2 1285.8 *******	1300.4 1300.7 1300.7 132999.0 11299998.9 11299988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 1129988.9 112988.9 11	TION ********** ERED EVENTS ELEV,FT.
83.33 85.42 87.50 89.58 91.67 93.75 95.83 97.92 ******	2.46.8.9.0087532087520875208752087520875208752087520875	********* WEIRULL PLOT POS
******	*************************************	* * * *

-FI OTTING	POSTTIONS-	HTNNT	RESERVOIR	FIFUATION

								********** PERED EVENTS		**
* * *	мом	DAY	YEAR	ELEV,FT.	*	RANK		ELEV,FT.		-4-
***********	9909959555955	-1 -1 -1 -1 -1 -1 -1 -1 -1	1930 1931 1932 1933 19334 19336 19337 1938 1940 1941 1943	1296.0 1293.8 1291.3 1284.8 1284.5 1286.3 1287.5 1292.3 1297.7 1291.7 1291.7	************	123456789011231111234	1934 1933 1935 1936 1936 1940 1932 1931 1939 1930 19742	1284.8 1284.8 1286.3 1287.5 1291.3 1291.7 1292.8 1293.9 1296.1 1296.1	2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.75 20.83 22.92 25.00 27.08	**************
***	5 5	-1 -1 -1	1944 1945	1297.9 1298.4	*	15 16	1961 1958	1296.4 1297.0	31.25 33.33	*

*******************	9595979599555599555999589995799		19449 194449 19555555555555556789 19555555555556789 195555555556789 19777777 1977 1977 1977 1977 1977 19	03366449 888.66449 9888.66449 122997788.668 12299788.77.688.89.88.643 122997888.77.688.89.88.643 122997888.69.88.643 122997888.69.88.643 12299888.69.88.643 12299888.69.88.643 12299888.69.88.69.88.643 12299888.69.89.89.89.89.89.89.89.89.89.89.89.89.89	********************	789012345678901234567890123454	1976437534328614357678242951454 19764775346664714357678242951454 197647199647755678242951454	3356689 977689 97777689 9777777689 112229977777689 112229988689 112229888689 112229888689 112229888689 112229888689 112229888689 112229888689 112229888689 112229888689 112229888689 1122298888689 1122298888689 1122298888689 1122298888888888888888888888888888888	2087532087532087532087532087533334435700246802468802577788888889753	****************
* *	9 9	-Ī	1975 1976	1298.5	*	46 47	1966 1950	1299.0 1299.6	95.83 97.92	**

99675	6666585866697675775866887767796677776557567
-1 -1 -1 -1	
1972 1973 1974 1975 1976	0123456789012345678901 11123456789012345678901 111234567890123456789012345678901 11123456789012345678901
1294.9 1294.0 1295.0 1295.0 1293.8 *******	11129999999999999999999999999999999999
***	***************************************
43 44 45 46 47	123456789012345678901234567890123456789012
1931 1936 1937 1935 1934	1963.63 1975.6
1293.1 1292.4 1292.0 1291.8 1290.9	83221110099999553 299555555554444444444444444444444444444
89.58 91.67 93.75 95.83 97.92	24 680.257.791.35.79.1087.532087.500000000000000000000000000000000000

-DIOTTING	POSITIONS-	1 EECH	DECEMBLATE	FIFUATION
~FIUIIINU	L02111042-	LEELM	RESERVUIK	CLEANITOM

*	****	***	****	*****	***	*****		******		*
***		EVE DAY	NTS AN	ELEV,FT.	**	RANK	WATER YEAR	ELEV,FT.	WEIBULL PLOT FOS	* * * +
****	9 9 9	-1 -1 -1 -1	1930 1931 1932 1933	1292.7 1292.7 1292.6 1292.0	***	1 2 3 4	1934 1935 1936 1937	1289.9 1290.9 1291.1 1291.6	2.08 4.17 6.25 8.33	***
****	9 5 9 5 9	-1 -1 -1 -1 -1	1934 1935 1936 1937 1938	1289.9 1290.9 1291.1 1291.6 1293.3	****	5 6 7 8 9	1933 1932 1931 1930 1976	1292.0 1292.6 1292.7 1292.7 1292.7	10.42 12.50 14.58 16.67 18.75	****
***	69855	-1 -1 -1 -1	1939 1940 1941 1942	1292.9 1293.1 1294.1 1293.8	***	10 11 12 13	1939 1958 1940 1938	1292.9 1293.0 1293.1 1293.3	20.83 22.92 25.00 27.08	***
*****	ກະນອະນະກ ຸ	-1 -1 -1 -1 -1	1943 1944 1945 1946 1947 1948	1294.2 1293.9 1294.4 1294.1 1294.4 1293.9	****	14 15 16 17 18 19	1959 1949 1961 1956 1973 1963	1293.4 1293.5 1293.5 1293.7 1293.7 1293.7	29.17 31.25 33.33 35.42 37.50 39.58	不米京米米山

本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本	595559959595555599555599996599		1945 1951 1951 1955 1955 1955 1955 1955	554 12717 104 0547 0 69 9 0 3827 787 12229 9 4 4 4 5 4 5 4 5 4 5 4 5 4 5 4 5 4 5	*****************	012345678901234567890123454 222222222333333333333334444444	1974 1974 1974 1974 1974 1975 1975 1975 1975 1975 1975 1975 1975	88999000111111222344445677770 33333334444444 299333444444444 2993334444444444	4190 43590 4779
*	9	-1 -1 -1	1973 1974 1975 1976	1294.8 1294.7 1292.7	***	45 46 47	1975 1974 1966	1294.7 1294.8 1294.9	93.75 95.83 97.92
**	****	ネボネボ	*****	******	***	*****	*****	*******	*******

- AMALYSIS OF HAZIBUMS -

* * * * * * * * * * * * * * * * * * * *	*** **
7 5 7 7 ***	***
-1 -1 -1 -1 ***	**** •EVE
1973 1974 1975 1976 *****	生中常常常常
1273.7 1274.5 1276.4 1273.2 ******	ONS-***
* * * * *	***
44 45 46 47 (****	*****
1976 1935 1939 1934 ******	*****
1273.2 1273.0 1272.9 1271.0 *******	VAREE ELEV.FT
91.67 93.75 95.83 97.92 ******	***·UP-0123420875320875087508750875087508750875087508750875
* * * * * *	. , *

- AMALYSIS OF MINIBUMS -

<u> 56565555698555779598995768</u>	** ** ** ** ** ** ** ** ** ** ** ** **
	**** ••EVI DAY -1 -1 -1
012334567 9955567 19955567 1995567 1995567 19957777777777777777777777777777777777	*** ***
1273.8 12772.8 12772.8 12772.8 12772.1 12772.1 12772.1 12772.8 12772.8 12772.8 12772.8 12772.8 12773.8 12773.8 12773.7 12773.7 12773.7 12773.7 12773.7 12773.7 12773.8	IONS- FOKE ************************************
***************************************	6年。 —— **********************************
123456789012345678901234567 22222223333333333344444444 ***	RESER**********************************
197557362234817944912857736422348179449128577364817944912857754***	*****
1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1273.6 1273.7 1273.7 1273.7 1273.7 1273.7	EVATION # # * * * * * * * * * * * * * * * * *
7892087532087532087532087532 44702468.556789087532087532 44702468.890087532087532 447027577778888888997532 447027577778888888997532	********* FLOT FOS 10.087 6.125 10.450 10
***********************	. *

* * * * * * * * * * * * * * * * * * * *	宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋	*.
5 5 7 k***	N - 575665665665665665659785656866666655555555656	• • • •
-1 -1 -1 -1 ****	DAY	.EVE
1974 1975 1976 ****	YEA - 31233456789 119333456789 119333456789 1194423445 1194423445 1194423 1194423 119553456789 11966789 119773 119	NTS AN
1218.3 1218.3 1216.3 ******	ELE-12166.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.6.	ALYZED
* * *		*
45 46 47 *****	KA 12345678901234567890123456789012345678901234	• • • • • •
1961 1933 1976 *****	YE-1948023465691245107159564902349086720324 1993448023346569124519955449333517899566491245199519956663349086720324	ORDE
1216.5 1216.5 1216.3 *******	ELEV-9888888888888888888888888888888888888	********* RED EVENTS
93.75 95.83 97.92 *****	FLD - 24680225791335791357913579135791357913579135791	WEIRULL
***		∦.

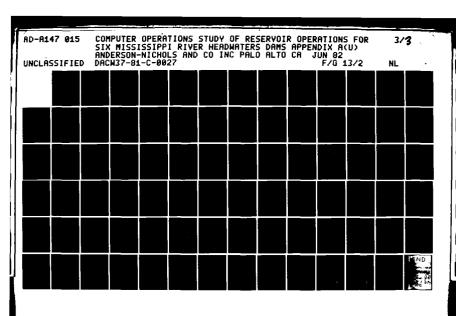
*********************	******	-***
56565955559555879599975799** ***	9595959	****
	-11-11-11-11-11-11-11-1-1-1-1-1-1-1-1-1-	**** ••EVE
19534567 195534567890 1195567890 119667 119667 119777 119777 119777 119777 119777 119777 119777	1930 1931 1932 1933 1934 1935 1936 1937 1949 1941 1942 1944 1944 1945 1946 1949 1950	*****
1216.6.3 1216.3	1215.4 1214.9 1216.2 1215.6 1215.6 1215.6 1216.3 1216.4 1216.6 1216.6 1216.6 1216.6 1216.6 1216.6 1216.6 1216.6	ONS- SAND ******** IALYZED ELEV,FT.
**************************************	- - - -	Y RES **** * * * * *
23456789012345678901234567 2222223333333333344444 444 ***	1234567890112345678901	SERVOIR ****** RANK
1957092343863570923343863598851199652524451199555244651***********************************	1931 1930 1930 1936 1933 1976 1933 1977 1947 1947 1947 1947 1947 1950 1937 1949 1951 1953	(*** * **)
12166.3333333333333333333333333333333333	1214.9 1215.4 1215.4 1215.6 1215.6 1215.7 1215.7 1215.1 1216.1 1216.2 1216.3 1216.3 1216.3 1216.3	TION ********* ERED EVENTS ELEV;FT.
50.00875332008753200875320087532008753200875320087532008750087500875008750087500875008750087	2.08 4.12332 8.45587 102.144.678 108.7557 118.789008 118.78908 118.78908 118.78908 118.78	WEIRULL :
*****************	***************	* * *

-PI OTTING	POSITIONS-	PINE	RESERVOIR	FIFUATION

	TLUI		PUSTII				ELEVAI	TUN		
					(**)	*****		******		ŗ
1		• • EV	ENTS AN	IALYZED	*••	,		ERED EVENTS		į.
*					*		WATER		WEIBULL X	ķ.
4	HON	DAY	YEAR	ELEV,FT.	*	rank	YEAR	ELEV,FT.	PLOT POS #	K
*					*					ŗ.
*	. 6	-1	1930	1229.6	*	1	1950	1230.4	2.08	ķ.
į		-1	1931	1229.6	*	2	1965	1230.0	4.17	ŗ.
1	6	-1	1932	1229.2	*	3	1943	1229.9	6.25	۲
*		-1	1933	1229.2 1229.6	*	4	1944	1229.6	8.33 1	r
1	667	-1	1934	1228.3	*	23456	1966	1229.9 1229.6 1229.6	10.42	ķ
Ą	7	-1	1935	1229.6	*	6	1938	1229.6	12.50	ķ
*	6	-1	1936	1229.6	*	Ž	1945	1229.6	14.58	Ķ
¥	6 7 5 7	-1	1937	1229.6	*	8	1937	1229.6	16.67	ļ.
*	5	-1	1938	1229.6	*	9	1935	1229.6	18.75 *	į.
*	. 7	-1	1939	1229.6 1229.6 1229.6 1229.5	*	10	1941	1229.6 1229.6 1229.6	20.83 *	Ç.
*		-1	1940	1229.5	*	11	1942	1229.6	22,92 *	Ķ
*	5	-1	1941	1229.6	*	12	1933	1229.6	25,00 *	ŗ.
*	5 6 6	-1	1942	1229.6	*	12 13	1946	1229.6 1229.6	22.92 25.00 27.08 29.17	(
×	6	-1	1943	1229.9	*	14	1947	1229.6	29.17 *	Į.
×	6	-1	1944	1229.6	*	15	1948	1229.6	31.25 *	ž.
×	6 5 7	-1	1945	1229.6	*	16	1949	1229.6	33.33 *	
¥	7	-1	1946	1229.6	*	17	1930	1229.6	35.42 *	1
*	6	-1	1947	1229.6	*	18	1951	1229.6	37.50 *	Ĺ
¥	5	-1	1948	1229.6	*	19	1952	1229.6	39.58 *	i
*	7	-1	1949	1229.6	*	20	1953	1229.6	41.67 *	
¥	5	-1	1950	1230.4	*	21	1954	1229.6	43.75 *	
¥	575656575797	-1	1951	1229.6	*	22	1955	1229.6 1229.6	45.83 \$	Ĺ
*	5	-1	1952	1229.6	*	23	1956	1229.6 1229.6 1229.6	47.92 *	,
*	6	-1	1953	1229.6	*	24	1957	1229,6	50.00 *	1
*	5	-1	1954	1229.6	*	25	1959	1229.6	52.08 *	Ĺ
*	7	-1	1955	1229.6	*	24 25 26	1960	1229.6	54.17 *	Ĺ
*	5	-1	1956	1229.6	*	27	1962	1229.6	56,25 *	(
*	7	-1	1957	1229.6 1228.9 1229.6	*	28 29 30	1963	1229.6 1229.6	58.33 *	(
*	9	-1	1958	1228.9	*	29	1964	1229.6	60.42 *	(
*	7	-1	1959	1229.6	*	30	1931	1229.6	62.50 *	ï
*	6	-1	1960	1229.6	*	31	1967	1229.6	64.58 *	Ĺ
*	8 6 7	-1	1961	1229.3	*	32 33	1968	1229.6	66 - 67 *	
*	6	-1	1962	1229.6 1229.6	*	33	1969	1229.6 1229.6	68.75 ×	
*		-1	1963	1229.6	*	34	1970	1229.6	70.83 *	
×	ģ	-1	1964	1229.6	*	35	1971	1229.6	72.92 *	
×	6 5 5	-1	1965	1230.0	*	<u>36</u>	1972	1229.6 1229.6	75.00 *	
*	Ş	-1	1966	1229.6	*	37	1973	1229.6	77.08 *	
*	Ģ	-1	1967	1229.6	*	38	1974	1229.6	79.17 *	
*	6	-1	1968	1229.6	*	39	1975	1229.6	81.25 *	
Ŧ	5 5	-1	1969	1229.6	*	40	1936	1229.6	83.33 *	
*	j.	-1	1970	1229.6	*	41	1940	1229.5	85.42 *	
*	5	-1	1971	1229.6	*	42	1939	1229.5	87.50 *	
*	٦	-1 -1	1972	1229.6	*	43	1961	1229.3 1229.2	89.58 *	
÷	4	- <u>1</u>	1973 1974		* *	44 45	1932 1958	1229 2 1228 9	91.67 * 93.75 *	
Ť	뒥	-i	1975	1229.6 1229.6	*	46	1976	1228.8	95.83 *	
×	5 5 7 5 5 7	-1	1976		*	47	1934	1228.3	97.92 *	
7	,	-	1//0	125010	~	7/	1/37	122010	1111 h	

- ANALYSIS OF MINIHUMS -

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うちゅうちちちちちちちゅうちゅうちちちらう	<u> </u>	нон
	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	DAY
1954 1955 1955 1957 1958 1959 1960 1961 1963 1964 1965 1966 1970 1970 1971 1972 1973 1975 1975	1930 1933 1933 1933 1933 1933 1933 1933	YEAR
12222222222222222222222222222222222222	12288-9 112288-6 122288-57 122288-57 122288-57 1222288-9 1222288-9 12222288-9 12222288-9 12222288-9 12222288-9 12222288-9 12222288-9 12222289-9 12222289-9 12222289-9 12222289-9 12222289-9 12222289-9 12222289-9 12222289-9	ELEV,FT.
*************	- - - - - - - - - - - - - - - - - - -	* * ·*-
56789012345678901234567 20223333333333344444444	12345678901234	RANK
19623 19623 19623 19648 19767 19666 1975 1975 1977 1977 1977 1977 1977 1977	1976 1976 1976 1978 1973 1973 1973 1973 1973 1973 1973 1973	WATER YEAR
99999999999999999999999999999999999999	1227.6 1227.9 12228.6 12228.6 12228.6 12228.6 12228.7 12228.7 12228.8 12228.8 12228.9 12228.9 122228.9 122228.9 122228.9 122228.9 122228.9 122228.9 122228.9	ERED EVENTS ELEV,FT.
87532087532087532087532 0175320875320875320875320875320875320875777788579135597	2.08 4.25 8.425 8.425 102.558 102.558 102.557 146.783 108.783	WEIRULL FLOT FOS





- ANALYSIS OF HINIMUMS -

************		1
55555558899599955969	95999595855755565565959555	****
-11-11-11-11-11-11-11-11-11-11-11-11-11	DAY -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	***** ••EVE
1957 1958 1959 1960 1964 1964 1965 1967 1970 1971 1973 1975 1976 *****	YEAR 19312334567811933781193370119337011944231194567119554119554119554119556	****** AA STA
1193.6 1193.6 1193.6 1193.5 1193.5 1193.5 1193.5 1193.6 1193.6 1193.6 1193.9 1194.0 1194.0 1194.0 1194.0 1194.0 1194.0	ELEV,FT. 1193.0 1193.0 1193.5 1193.5 1193.6 1193.6 1193.6 1193.6 1193.6 1193.6 1193.6 1193.7 1193.7 1193.7 1193.7	IALYZED
*************************************	**********************	**** • • * •
22333333333442345678901234567890123456789012345678901234567***	RANK 12345678901123456789011234567	*****
1943 19573 19573 19567 19548 1941 1941 19775 1975 1975 1975 1975 1975 1984 1984 1984 1984 1985 1985 1985 1985 1985 1985 1985 1985	YEAR 1972-611933-51933-1933-1933-1933-1933-1933-193	ORD WATER
1193.6 1193.6 1193.6 1193.9 1193.9 1193.9 1193.9 1193.9 1193.9 1194.0 1194.0 1194.0 1194.0	ELEV, FT. 1192.6 1192.6 1192.6 1193.0 1193.1 1193.4 1193.4 1193.5 1193.5 1193.6 1193.6 1193.6 1193.6 1193.6 1193.6 1193.6 1193.6	********** ERED EVENTS
560.587 580.587 580.587 580.6753 580.6753 7757.081 7757.79.232 7757.79.232 7757.79.32 7757.79.32 7777.79.32 7777.79.32 7777.79.32	PLOT FOS 2.0175 2.0175 4.123320 4.123320 102.587 102.587 102.587 102.587 102.587 102.587 103.587 10	********* WEIBULL PLOT POS
***************	************************	**

-FLOTTIN	G POSITIONS	- ATTEIN	FION
	3 FUSILIUNS	AIL/11 H = 5	FLUM

***************	****************	
5454645440654	56554555545456686457557	****
	-11-11-11-11-11-11-11-11-11-11-11-11-11	**** ••EVE
1995578901234567890123456**	193123 193323 1933345 193333 193337 193337 19441 194445 194445 19553 195123	*****
10760. 4693. 11326. 5296. 21894. 5197. 5194. 5194. 62088. 136188. 92037. 16307. 13047. 77633. 20215. ************************************	3329. 2180. 2850. 2657. 1984. 2987. 4903. 3931. 1150. 5548. 3322. 10529. 4843. 10641. 10531. 5689. 14723. 5590. 21592. 14428. 12249.	ONS- AITK ********* ALYZED FLOW,CFS

56789012345678901234567 2222233333333344444567 ***	12345678901123456789012324	
194699 19750 19750 19750 19750 19750 19753 19753 19753 19753 19753 19753 19753 19753 19753 19753	1955 19768 197645 197645 1975 1975 1975 1975 1974 1977 1977 1976 1976 1976 1976 1976 1976	******* ORDI WATER YEAR
6208. 5208. 5208. 5559. 5559. 5559. 5559. 568. 5759. 588. 5759. 588	21595. 20217. 16309. 14723. 13688. 13118. 13048. 12249. 11428. 11326. 11150. 11047. 10881. 10760. 10643. 10531. 10531. 10529. 9777. 9203. 77442. 7314. 6589.	********* ERED EVENTS FLOW,CFS
012532087520875208752087520875208752087520875	2.08 4.125 4.125 102.50 8.122.60 102.4.567 102.50 102.4.567 103.320 10	******** WEIBULL FLOT POS
***************	**************************************	**

_EI OTTTNE	POSTTIONS-	ANOKA	FLOW	

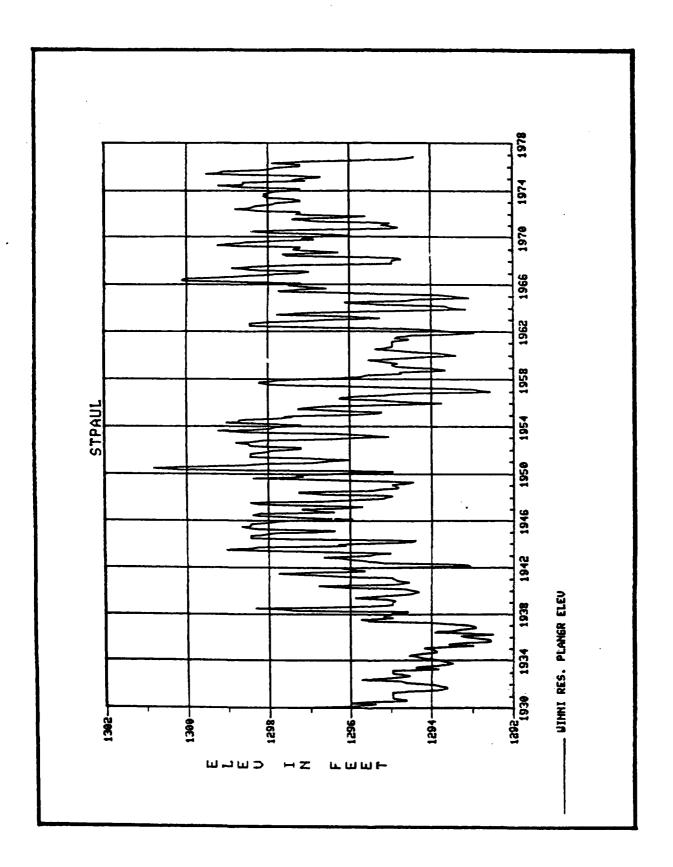
-F	LOT	ING	POSITI	ONS- ANDKA (**********	FLOW ********	*****	*****	*******
*	*****				k		RED EVENTS	*
*	МОМ	DAY	YEAR	FLOW, CFS	K K RANK	WATER YEAR	FLOW, CFS	WEIEULL * FLOT POS >
*	1 2 8	-1 -1	1930 1931	2323.	1 2	1934 1935	610. <u>201</u> .	2.08 # 4.17 #
*	10	-1 -1	1932 1933	1103.	k 2 k 4	1936 1933	877. 1103.	6.25 * 8.33 *
*	8	-1	1934 1935		k 5	1932 1938	1398. 1628.	10.42 * 12.50 *
*	1 8 3	-1 -1	1735	877.	k 6 k 7	1940	1847.	14.58 *
*	3	-1	1937	1986.	k 8	1976	1945.	16.67 *
*	12	-1 -1	1938 1939	1628. ×	k 9 k 10	1930 1937	1959. 1986.	18.75 * 20.83 *
*	^ <u>2</u>	-ī	1940	1847.	k 11	1931	2323.	22,92 🕦
*	1	-1 -1	1941 1942	2678. 2 2738. 2	k 12 k 13	1961 1962	2381	25.00 * 27.08 *
*	9	-i	1943	4007.	k 14	1959 1950	2397. 2398.	29.17 *
*	1	-1	1944	4349	k 15	1950	2399. 2418.	31.25 * 33.33 *
*	1 9	-1 -1	1945 1946	3625.	k 16 k 17	1939 1970	2434.	35.42 *
*	10	-1	1947	3074	k 18	1948	2436. 2445.	35.42 * 37.50 * 39.58 *
*	10	- <u>1</u>	1948 1949	2436 · 2560 · 3	k 19 k 20	1967 1968	2445. 2498.	39.58 * 41.67 *
*	11	-1	1950	3466.	k 21	1949	2560.	43.75 *
*	11	-1 -1	1951 1952 1953	4115.	22 23	1964 1956	2571. 2584	45.83 * 47.92 *
¥	1	-1	1953	4831.	k 24	1969	2584. 2678.	50.00 *
*	12	-1	1954	4178	25	1941 1958	2678.	52.08 * 54.17 *
*	11 10	- <u>1</u> -1	1955 1956	3120. 2584.	26 27	1942	2696. 2738. 2822.	54.17 * 56.25 * 58.33 *
*	1	-1	1957	3060.	28	1963	2822.	58.33 *
*	8 2 12	-1 -1	1958 1959	2696. 2398. 2399.		1957 1947	3060. 3074.	60.42 * 62.50 *
*	12	-1	1960	2399	31	1965	3090.	64.58 *
*	1	-1 -1	1961 1962	2381. × 2397.	k 32 k 33	1955 1971	3120. 3126.	66.67 * 68.75 *
*	11	-1	1963	2822.	k 34	1974	3204.	70.83 *
*	8	-1	1964	2822. 2571.		1950 1946	3466. 3625.	72.92 *
*	3 12 12 19	-1 -1	1965 1966	3090 · 3	k 36 k 37	1952	3945.	75.00 * 77.08 *
*	12	-1	1967	2445.	k 38	1943	4007.	79.17 X
*	1	-1 -1	1968 1969	2445. 2498. 2678.	k 39 k 40	1951 1954	4115. 4178.	81.25 * 83.33 *
*	9	-1	1970	2434.	k 41	1975	4235.	85,42 *
*	12	-1 -1	1971 1972		k 42 k 43	1945 1944	4275. 4349.	87.50 * 89.58 *
*	12 7	-1	1973	4609.	k 44	1973	4609.	91.67 *
*	9	-1	1974		k 45	1953	4831.	93.75 *
*	12 	-1 -1	1975 1976	4235. 1945. *******	k 46 k 47	1966 1972	4976. 6905.	95.83 * 97.92 * ******
**	k***	****	*****	****	k*****	*****	*******	*****

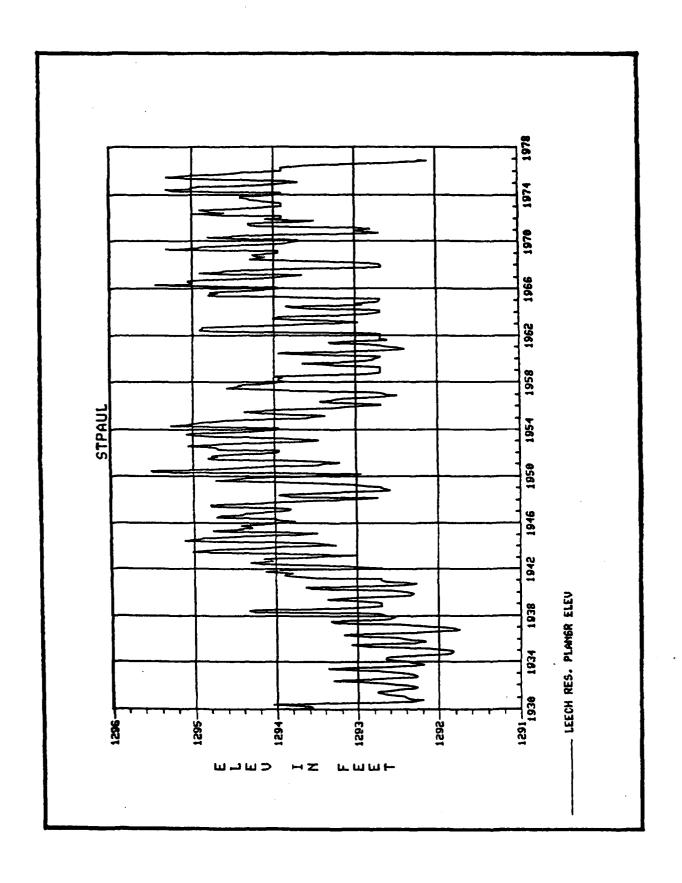
APPENDIX J

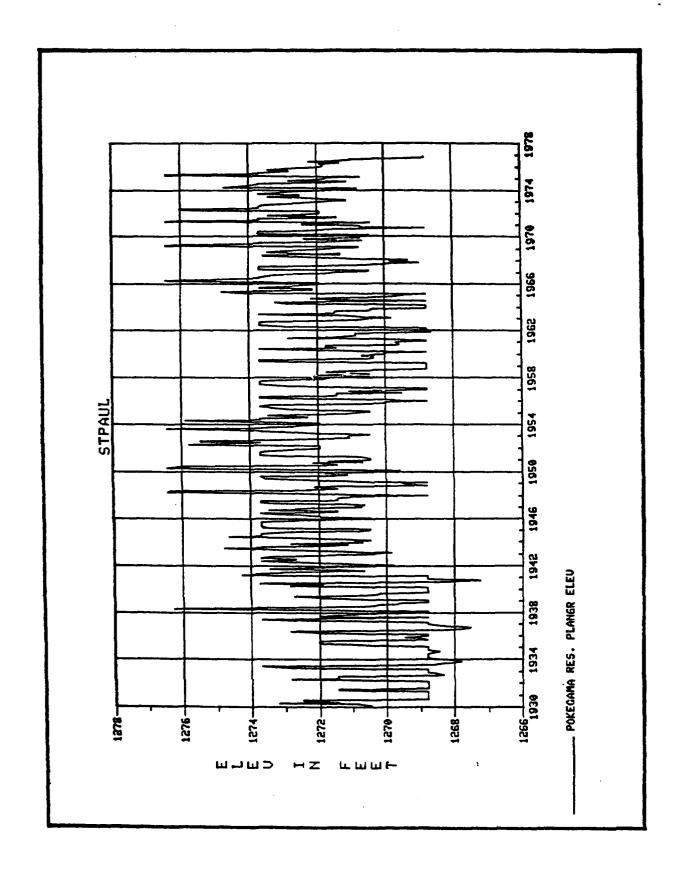
PLAN 6

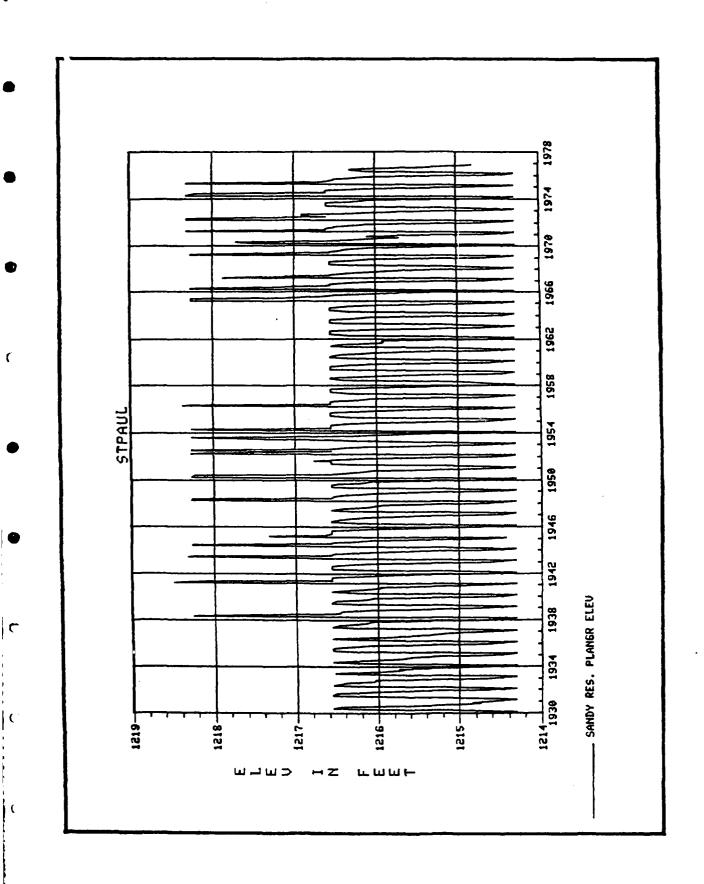
TIME SERIES DATA PLOTS
AND
ANNUAL MAX/MIN DATA TABLES

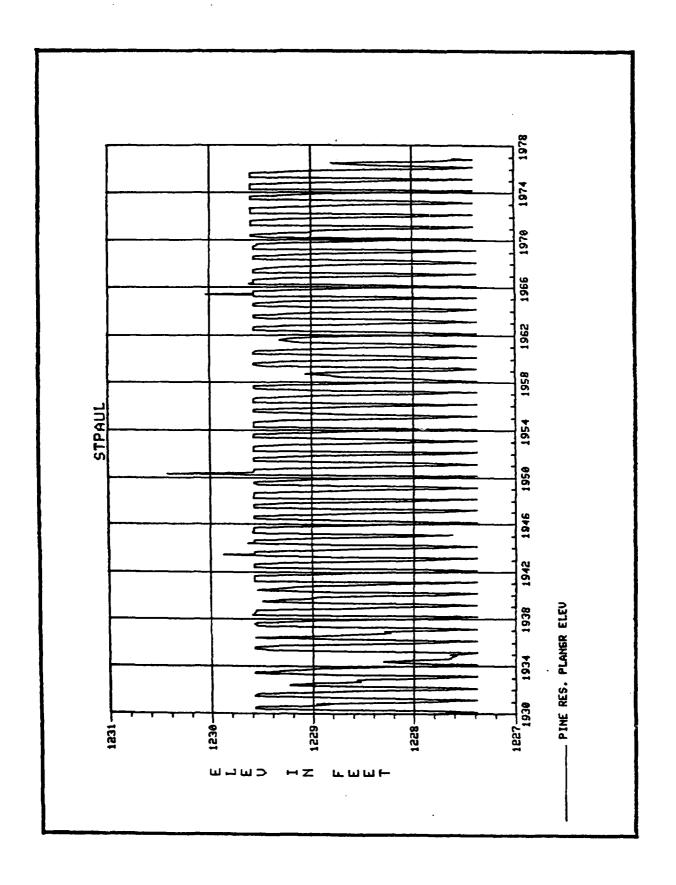
Note: The time series data plots in Appendices E through L are based on the complete period of record used in this study. The annual maximum and minimum data tables are only for the period of 1 May through 30 September for each year. The time series plot may have data values lower than those listed in the minimum data tables.





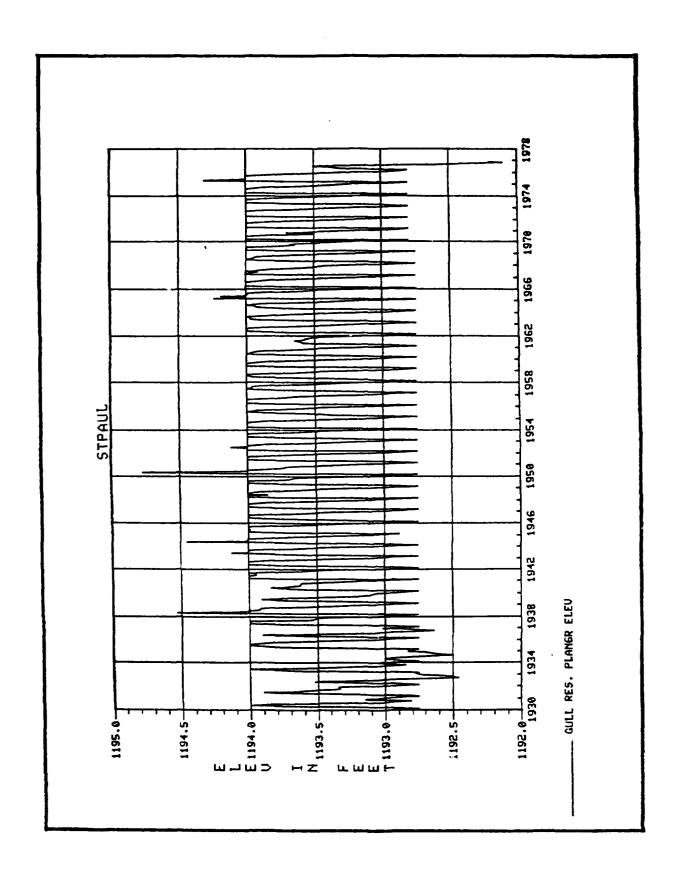


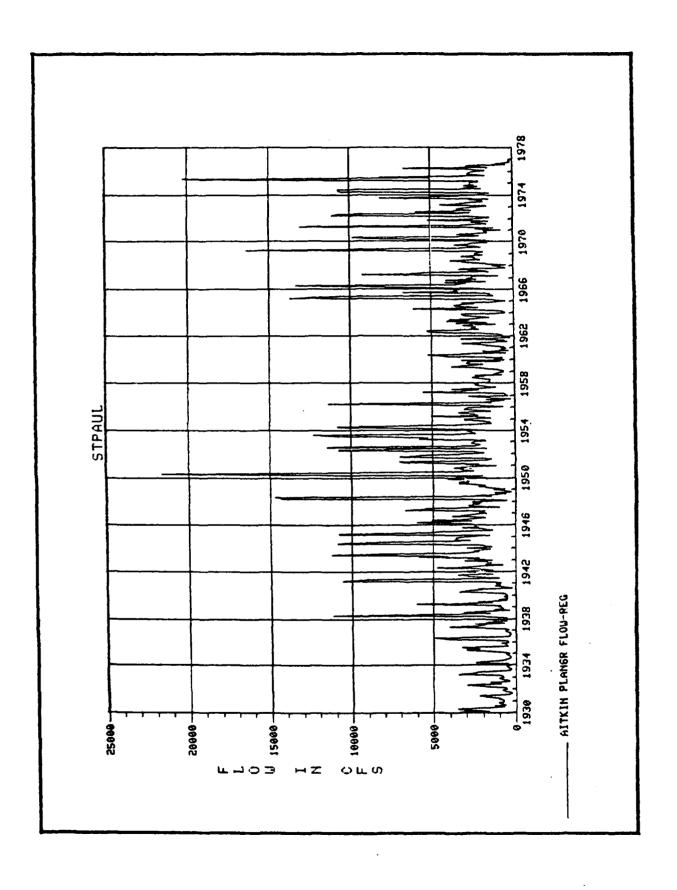


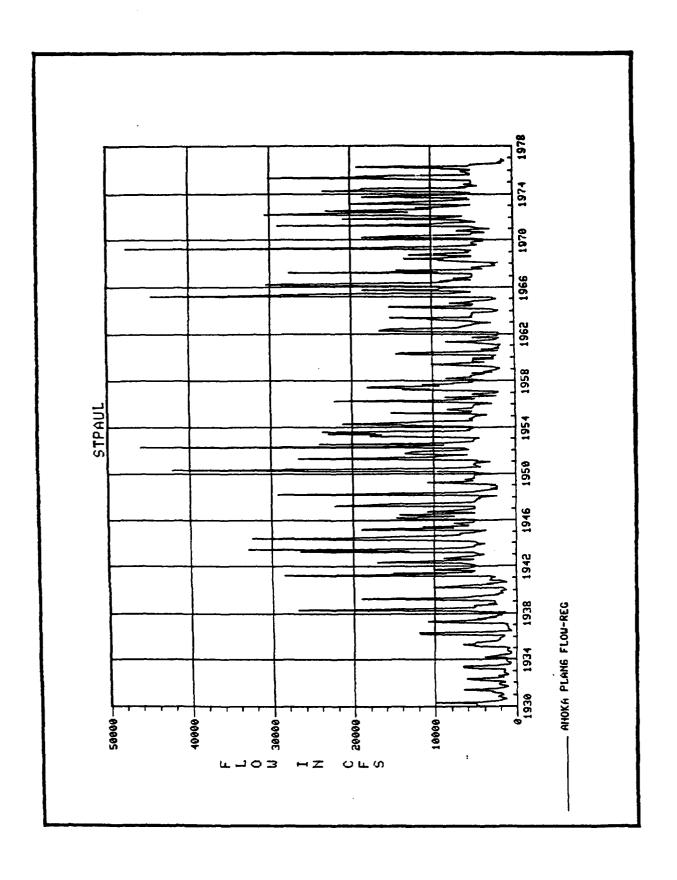


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-PLOTTING POSITIONS- WINNI RESERVOIR ELEVA	RERUNIR FLEUAT	RESERVOTE	TUNTE	POSITIONS-	-PLOTTING
--	----------------	-----------	-------	------------	-----------

***		7	
7 7	6566667766796767768668857695876777766	K K HON	- F L U I
-1 -1 -1		***** ••EVE DAY	1140
1969 1970 1971	1930 1931 1932 1933 1933 1933 1933 1933 1940 1944 1944 1944 1951 1953 1955 1955 1966 1966 1966 1966 1966 1966	XXXXXX NTS AN YEAR	LOSTI
1298.4	1296.9 1297.7	**************************************	TOWS - MINNI
* 40 * 41 * 42	1234567890123456789 11111111112222222223333333333333333333	******* * * * RANK	VESEKANI
1959 1960 1931	1966 1975 1966 1975 1976 1976 1976 1976 1976 1976 1976 1976	******* ••••ORDI WATER YEAR	V ELEVH
1295.5 1295.4 1294.9	1300.8 1300.1 1299.5 1299.2 1299.2 1299.0 12998.8 12988.4 12988.4 12988.4 12988.4 12988.4 12988.4 12988.4 12988.4 12998.1 12978.1 12977.7 12977.7 12977.7 12977.7 12977.7 12977.7 12977.7 12977.7 12975.7 12975.7 12975.7	********** ERED EVENTS ELEV,FT.	ITUN
83.33 85.42 87.50	2.08 4.17 6.25 10.58 112.58 11	WEIRULL PLOT POS	
***	一	*	

*****	5776766	-1 -1 -1 -1 -1 -1	1969 1970 1971 1972 1973 1974	1299.2 1298.4 1297.4 1298.8 1298.1 1299.2	****	40 41 42 43 44 45	1959 1960 1931 1961 1934 1933	1295.5 1295.4 1294.9 1294.9 1294.5 1294.4	83.33 85.42 87.50 89.58 91.67 93.75 95.83	****
*	. Š	- <u>1</u> -1	1976	1297.9	*	47	1935	1293.6	97.92	*

- ANALYSIS OF MINIHUMS -

-PI	OTTING	POSITIONS-	HTNNT	RESERVATE	FLEUATION

****	*****		(**********				*******	********	*
*	N DAY		ELEV,FT.	* * * * * * *	RANK	WATER YEAR	ELEV,FT.	WEIFULL PLOT POS	***
*****	9 -1 9 -1 9 -1 9 -1 9 -1 9 -1 9 -1 1 7 -1	1930 1931 1932 1933 1934 1935 1936 1937 1938 1939	1294.6 1293.6 1294.6 1293.6 1293.9 1292.5 1293.3 1294.9 1294.8		1 2 3 4 5 6 7 8 9 10	1935 1936 1933 1931 1931 1942 1958 1961 1957 1957	1292.5 1293.3 1293.6 1293.6 1293.9 1294.2 1294.2 1294.6 1294.6	2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.75 20.83 22.92	**********
* * *	9 -1 5 -1 5 -1 5 -1 5 -1	1941 1942 1943 1944 1945	1295.7 1294.2 1296.7 1295.3 1298.4	****	12 13 14 15 16	1964 1940 1976 1939 1960	1294.6 1294.8 1294.8 1294.8 1294.8	25.00 27.08 29.17 31.25 33.33	****

***************	9995959595959595555999995999595	1946 1947 1948 1950 1951 1955 1955 1955 1955 1961 1964 1965	1297.27 1297.29 1298.0 1298.0 1298.1 1297.9 1297.9 1297.9 1297.9 1297.9 1297.9 1297.9 1297.9 1297.9 1297.9 1297.9 1297.9 1297.9	京本市本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本	178 199 122 123 123 123 123 123 133 133 135 135 135 135 135 135 135 13	1959 1949 1946 1948 1940 1941 1953 1961 1965 1965 1965 1965 1965 1966 1966	1294.9 1294.9 1295.2 1295.2 1295.5 1295.7 1295.7 1295.7 1296.3 1296.3 1296.7 1296.7 1297.2	420 420 420 430 430 430 430 430 430 430 43
*	5 -1 9 -1	1956	1295.2	*	26 27	1955	1295.9	54.17 56.25
*	5 -1 9 -1	1957	1294.6	*	28 29	1971	1296.2	58.33
*	5 -1	1959	1294.8		30 31	1953	1294.3	62.50
*	5 -1	1961	1294.5	*	32	1965	1296.6	66.67
*	5 -1 9 -1	1963	1296.3	*	34	1947	1296.7 1296.7	68.75 70.83
*	9 -1	1964	1294.6	*	35	1967	1297.2	72.92
į	\circ $-\frac{1}{1}$	1966	1296.6 1299.0	ž	37	1969	1297.2 1297.7	77.08
¥	9 -1 5 -1	1967 1968	1297.2 1295.7	X X	38 39	1973 1954	1297.7 1297.9	79.17 81.25
*	9 -1	1969 1970	1297.7	*	40	1951	1298.0	83.33
*	9 -1 9 -1	1971	1295.5 1296.2	*	41 42	1972 1952	1298.3 1298.4	85.42 87.50 89.58
*	9 -1 5 -1	1972 1973	1298.3 1297.7	*	43	1945 1975	1298.4	
į	9 -1	1974	1298.6	*	44 45	1974	1298.6 1298.6	91.67 93.75
*	5 -1 9 -1	1975 1976	1298.6 1294.8	*	46 47	1950 1966	1298.6 1299.0	95.83 97.92

****		1
9	N-6666575766697675775867885757786666776557557	k**** k K
-1 -1 -1 -1	PAY	**** ••EVE
1972 1973 1974 1975 1976	YEAR 1931 1932 1933 1933 1933 1933 1933 1933	
1295.0 1295.3 1295.3 1295.2 1293.8	ELEV, FT	********* IALYZED:
***	**************************************	**** ••* *
43 44 45 46 47	RAN 1234567890123456789012345678901234567890123456789012345678901234567890123456789012	******
1932 1936 1935 1931 1934	YE-519443 1967443 1975743 1975743 1975743 19757	R ELEVA ****** ORDI WATER
1293.3 1293.2 1293.1 1292.8 1292.6	ELE-12975 122955 122955 122955 122975 122975 122975 122975 122974	TION ********** ERED EVENTS ELEV,FT.
89.58	FLOT - 24.05 - 24.05 - 27.05 - 24.05 - 27.05 - 24.05 - 25.06 -	********* WEIBULL PLOT POS
!!!!	*********************************	***

- ANALYSIS OF HINIHUMS -

*	***	k***	*****	ONS- LEECH ********** ALYZED	********	*****			***
*	HON	DAY	YEAR	ELEV,FT.	RANK	YEAR	ELEV,FT.		¥
*************	999999999955558599	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	1930 1931 1932 1932 1934 1935 1936 1937 1940 1941 1942 1943 1944 1945 1944 1947	1294.0	123456789011234567891112345678911123456789111234567891112345678911123456888888888888888888888888888888888888	1934 1936 1935 1935 1930 1932 1940 1931 1939 1976 1961 1960 1937 1958 1970 1964 1938 1948	1291.9 1292.0 1292.3 1292.3 1292.4 1292.4 1292.6 1292.6 1292.7 1292.7 1292.9 1292.9 1292.9 1292.9	2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.67 120.83 22.92 25.00 27.08 29.17 31.25 33.33 35.42 37.50	**************

京京京京京京京京京京京京京京京京京京京京京京京京京京京		1950 1950 1950 1950 1950 1950 1950 1950	12994.3 12994.3 12994.3 12994.3 12994.3 12993.2 129922.4 12993.3 129922.4 129945.3 129945.3 12994.4 12994.8 12	*************************************	22222222222223333333333344444444444444	1959 1969 1969 1969 1969 1969 1975 1975 1975 1975 1975 1975 1975 197	1293.1 1293.6 1293.6 1293.6 1293.7 12993.8 12993.9 12994.0 112994.1 12994.1 12994.3 12994.3 12994.8 12994.8 12994.8 12994.8 12994.8 12994.8	41.67.82 675.82 675.82 675.82 675.82 676.82 676.82 677.83 677.	*****************
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6 5 6	**************************************	-
-1 -1 -1	**** • EVE	
1974 1975 1976	*****	
1274.5 1276.4 1272.2		
* * *	***	
45 46 47	*****	BEE==-
1958 1931 1934	0 * · · · · · · · · · · · · · · · · · ·	0.75
1271.7 1271.4 1268.8	*******	****
93.75 95.83 97.92		
***	**********************	

- AMALYSIS OF NIMINUMS -

	:
56585759979598799899897988	10N 95999989878795588898
	DAY -1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1
1951 1953 1953 1955 1955 1955 1955 1966 1966 1966 1977 1977 1977 1977 1977	YEAR 1930 1931 1932 1933 1935 1935 1937 1938 1939 1941 1942 1943 1944 1945 1944 1945 1946 1947
1273.1 1273.7 1272.8 1272.7 1271.4 1272.8 1270.1 1270.3 1271.4 1270.8 1271.4 1268.8 1271.4 1268.8 1271.3 1271.4 1273.5 1271.4 1272.8 1271.4	1268.8 1268.8 1268.6 1268.3 1268.8 1267.5 1268.8 1270.2 1270.2 1270.7 1271.4 1272.8 1273.7 1271.4 1271.4
本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本	
23456789012345678901234567	RANK 123 45 67 89 101 112 13 14 15 16 17 18 19 20 21
19460 19460 19460 19451 19451 1957 1957 1957 1957 1957 1957 1957 19	WATER YEAR 1933 1933 1934 1932 1937 1942 1937 1958 1958 1958 1959 1961 1976 1976 1976 1976 1976
1271.4 1271.4 1271.4 1271.4 1271.4 1271.4 1271.4 1271.4 1271.4 1271.4 1271.5 1272.5 1272.8 1272.8 1272.8 1272.8 1273.6 1273.7	1267.5 1268.3 1268.4 1268.6 1268.8 1268.8 1268.8 1268.8 1268.8 1268.7 1270.1 1270.2 1270.2 1270.3 1270.6 1270.7 1270.7
32087520875208752087520875208752087520875	WEIRULL PLOT -08 4.253 10.558 10.558 16.753 225.08 16.753 225.08 16.753 225.08 29.175 335.450 337.558 41.75
	S

- * *	****	****	******	ONS- SANDY ********** ALYZED	*******	******* ORDI	TION ********* ERED EVENTS	*
**	нон	DAY	YEAR	ELEV,FT.	RANK	WATER YEAR	ELEV.FT.	WEIBULL * PLOT POS *
本 市 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋 宋	- - - - - - - - - - - - - - - - - - -		19312334 19332334 19332334 19332334 193323 19431 19442 19442 19442 19443 19443 19443 19443 19553 19553 19663 19668 19772 19773 19774	1216.6 1216.6 1216.6 1216.6 1216.6 1216.6 12116.6 12116.6 12116.6 12118.6 12118.6 12118.6 12118.6 12118.6 12118.7 12116.6 12118.7 12118.8 12116.6 1211	1234567890112345678901123456789012334567890123444444444444444444444444444444444444	193448023465691245119711975517890234490234656912451199551789566777771199519956677777119951995667777119951995677945119951995677711995199567794511995199567771995677199567719956771995677199567719956771995677199567719956777199567719957719957719957719957719957719957719957719957719957719957719957719957719957719957771995771995777199577719957771995777	1218.33333333333333333333333333333333333	**************************************

*	5	-1	1975	1218.3	*	46	1933	1216.5	95.83	1
*	7	-1	1976	1216.3	*	47	1976	1216.3	97.92	- 1
***	***	****	*****	*******	****	*****	******	*******	******	***

-PLOTTING	POSITIONS-	YUNGS	RESERVOIR	FI FUATTON
1 -011110	1 001110110	JOHELI	VEDENACT!	

		1 1
99975799		HON
	-11111111111111111111111111111111111111	****
1953 1953 1955 1955 1955 1955 1958 1965 1965 1965 1977 1977 19775 19775 14***	1930 1931 1933 1933 19334 1935 1935 1937 1942 1944 1944 1944 1946 1947 1948 1949 1951	PDS111 ****** ENTS AN YEAR
1216.63 1216.63 1216.63 1216.63 1216.63 1215.88 1215.8 1215.9 1216.63 1216.64 1216.63 1216.63 1216.63 1216.63 1216.63 1216.63 1216.63 1216.63 1216.63	1215.4 1214.9 1216.2 1215.6 1215.7 1216.3 1216.3 1216.3 1216.3 1216.3 1216.3 1216.3 1216.3 1216.3 1216.3 1216.3	DNS- SANDY ********* ******* ******* ********* ****
224567899012334567899012334567899012334567899012334567899041234467***********************************	12345678901123456789011234567890112345678901123456789000000000000000000000000000000000000	RESERVOI ******** * RANK
1957 1960 1932 1963 1964 1943 1948 1946 1975 1975 1975 1975 1975 1975 1974 1974 1974 1974	1931 1938 1930 1976 1936 1934 1934 1959 1961 1947 1947 1950 1932 1937 1944 1951 1953 1955	****** @ORD WATER
1216.3 1216.3 1216.3 1216.3 1216.3 1216.3 1216.3 1216.4 1216.4 1216.6 12	1214.9 1215.0 1215.4 1215.6 1215.7 1215.7 1215.9 1216.1 1216.2 1216.2 1216.3 1216.3 1216.3	
50.008 50.008	2.08 4.17 6.33 10.58 12.58 14.67 18.75 22.90 27.08 29.12 33.42 37.50 37.50 41.67	S WEIRULL
************************	本本水水水水水水水水水水水水水水水水水水水水	* * * * *

-PLOTTING	POSITIONS-	PINE	RESERVATE	FI FUATTON

	-F'LU1 (****				(ESERVOIR (*******		*********** TUN	*****
*	• • • •	. EV	ENTS AN	ALYZED	*		ERED EVENTS	
*	אסא	DAY	YEAR	ELEV,FT.	* RANK	WATER YEAR	ELEV,FT.	WEIRULL * PLOT POS *
*	67	-1 -1	1930 1931	1229.6 1229.6	* 1 * 2 * 3	1950 1965	1230.4 1230.0	2.08 * 4.17 *
*	6	-i	1932	1229.2	* 3	1943	1229.9	6.25
*	6	-1	1933 1934	1229.2 1229.6 1228.3	* 4	1944	1229.6 1229.6	8.33 *
*	9	-1 -1	1935	1229.6	* 5 * 7 * 8	1966 1938	1229.6	10.42 * 12.50 *
*	6	-1	1936	1229.6 1229.6 1229.6	¥ 7	1945	1229.6 1229.6 1229.6	14.58 *
*	5	-1 -1	1937 1938	1229.6 1229.6	* 8 * 9	1937 1935	1229.6 1229.6	16.67 * 18.75 *
¥	_	-i	1939	1229.5	* 10	1941	1229.6	20.83
*	6	-1	1940	1229.5	* 11	1942	1229.6	22,92 *
*	5 6	-1 -1	1941 1942	1229.6 1229.6	* 12 * 13	1933 1946	1229.6 1229.6	25.00 *
*	6	-i	1943	1229.9	* 14	1947	1229.6	27.08 * 29.17 *
*	6	-1	1944	1229.6	* 15	1948	1229.6	31.25
*	7	-1 -1	1945 1946	1229.6 1229.6	* 16 * 17	1949 1930	1229.6 1229.6	33.33 * 35.42 *
¥	6	-i	1947	1229.6	¥ 18	1951	1229.6	37.56
*	5	-1	1948	1229.6	* 19	1952	1229.6	39.58 *
*	66576575656575797	-1 -1	1949 1950		* 20 * 21	1953 1954	1229.6 1229.6 1229.6	41.67 * 43.75 *
*	6	-ī	1951	1229.6	* 22	1955	1229.6	45.83 *
*	5	-1	1952	1229.6	* 23	1956	1229.4	47.92 *
*	ŝ	-1 -1	1953 1954	1229.6 1229.6 1229.6	* 24 * 25 * 26	1957 1959	1229.6 1229.6 1229.6	50.00 * 52.08 *
×	<u>Ž</u>	-1	1955	1229.6	¥ 26	1960	1229.6	54.17 *
*	5	-1 -1	1956 1957		* 27 * 28	1962 1963	1225.6	56.25 * 58.33 *
*	ģ	-ī	1958	1228.9	* 29	1964	1229.6 1229.6	58.33 * 60.42 *
*	7	-ī	1959	1229.6	* 30	1931	1229.6	62.50 *
*	6	-1 -1	1960 1961	1229.6 1229.3	* 31 * 32	1967 1968	1229.6 1229.6	64.58 * 66.67 *
*	8 6 7	-î	1962	1229.6	* 33	1969	1229.6	68.75 *
*	7	-1	1963	1229.6	* 34	1970	1229.6	70.83 *
*	6	-1 -1	1964 1965	1229.6 1230.0	* 35 * 36	1971 1972	1229.6	72.92 *
*	Š	-1	1966	1229.6	* 37	1973	1229.6 1229.6 1229.6 1229.6	75.00 * 77.08 *
*	5	-1	1967 1968		* 38	1974 1975	1229.6	79.17 *
*	ŝ	-1 -1	1969	1229.6	* 39 * 40	1936	1227.6	81.25 * 83.33 *
*	Š	- <u>ī</u>	1970	1229.6	* 41	1940	1229.5	85.42 *
*	5	-1 -1	1971 1972		* 42 * 43	1939 1961	1229.5 1229.3	87.50 * 89.58 *
*	665565555755	-i	1973		* 44	1932	1229.2	91.67
ţ	5	- <u>1</u>	1974	1229.6	* 45	1958	1228.9	93.75 *
*	7	-1 -1	1975 1976	1229.6 1228.8	\$ 46 \$ 47	1976 1934	1228.9 1228.8 1228.3	95.83 * 97.92 *
*	k***	***	*****	******	******	*****	********	******

**************************************	本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本本	** *.
59555555555549589555559**	555595958555555555555555555555555555555	***
-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	***
1955 1956 1957 1958 1959 1960 1962 1963 1964 1965 1968 1969 1970 1971 1972 1973 1976 1976 1976	1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1948 1949 1950 1951 1952	k*****
1228.6 1228.0 1228.0 1228.0 1228.7 1228.7 1228.9 1228.9 1228.9 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.8	1228.9 1228.6 1228.6 1228.7 1228.7 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1229.6 1228.9 1229.6 1229.6 1229.6 1229.6	ONS- PINE ********* ALYZED ELEV,FT.
**************************************		****
678901233533344444444444444444444444444444444	123456789011231456789011234567890222345	*****
1960 1962 1943 1964 1968 19767 1958 1966 1953 1955 1975 1977 1975 1975 1975 1950 ****	1934 1976 1958 1958 1959 1955 1955 1936 1938 1946 1945 1946 1947 1957 1957 1953 1951 1953 1954 1954 1954 1954 1954 1954	******
1228.9 1228.9 1228.9 1228.9 1229.0 1229.5 1229.5 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6 1229.6	1227.6 1227.9 1228.0 1228.6 1228.6 1228.7 1228.7 1228.7 1228.8 1228.8 12228.8 12228.9 12228.9 12228.9 12228.9 12228.9 12228.9 12228.9 12228.9	********
56.25 58.33 60.42 62.58 66.67 72.92 77.08 77.125 83.32 87.58 87.58 91.67 93.78 95.98	2.08 4.17 6.32 102.58 102.58 114.56 114.56 118.75 116.75 116.82 116.82 116.83 1	WEIRULL
*********************	****************	***

-PLOT1	ING	POSITI	ONS- GULL RI	ESERVOIR E	LEVATI	ON	******
			ALYZED	k	ORDE	RED EVENTS	WEIRULL *
* HON	DAY	YEAR	ELEV,FT.	RANK	YEAR	ELEV,FT.	PLOT POS *
* 6	-1	1930	1194.0	1	1950 1938	1194.8 1194.5	2.08 * 4.17 *
* 7 * 6	-1 -1	1931 1932	1193.5	* 3	1944	1194.4	6.25 *
* 6 * 5 7	-1 -1	1933 1934	1193.0	* 4 * 5	1975 1965	1194.3 1194.2	8.33 * 10.42 *
* 7 * 6	-1 -1	1935 1936	1194.0	¥ 6 ¥ 7	1943 1952	1194.1 1194.1	12.50 * 14.58 *
* * * * * * * * * * * * * * * * * * *	-i -i	1937 1938	1194.0	k 8	1937 1941	1194.0 1194.0	16.67 * 18.75 *
‡ ?	-Ī	1939	1193.9	k 10	1942	1194.0	20.83 *
* 5	-1 -1	1940 1941	1194.0	12	1935 1945	1194.0 1194.0	25.00 *
* 6 * 6	-1 -1	1942 1943		k 13 k 14	1946 1947	1194.0 1194.0	27.08 * 29.17 *
* 6 * 5 * 7	- <u>1</u> -1	1944 1945	1194.4	k 15	1948 1949	1194.0 1194.0	31.25 * 33.33 *
* 7	-ī	1946	1194.0	¥ 17	1951	1194.0	35.42 *
* 6 * 5	-1 -1	1947 1948	1194.0	k 19	1953 1954	1194.0 1194.0	37.50 * 39.58 *
* 6 * 5	-1 -1	1949 1950	1194.8	k 21	1955 1956	1194.0 1194.0	41.67 * 43.75 *
656567658578668 ******	- <u>î</u> -1	1951	1194.0	* 22	1957 1958	1194.0 1194.0	45.83 * 47.92 *
¥ 6 ¥ 5	-i -1	1952 1953 1954	1194.0	k 24	1959 1960	1194.0	50.00 * 52.08 *
* 8	-ī	1955	1194.0	k 26	1962	1194.0	54,17 *
* 5 * 7	-1 -1	1956 1957	1194.0	k 28	1963 1964	1194.0 1194.0	56.25 * 58.33 *
* 8 * 6	-1 -1	1958 1959			1966 1967	1194.0 1194.0	60.42 * 62.50 *
* 6	-1 -1	1960 1961	1194.0	k 31	1968 1969	1194.0 1194.0	64.58 * 66.67 *
* 6	-ī	1962	1194.0	k 33	1970	1194.0	68.75 *
* 9 * 9	-1 -1	1963 1964	1194.0	35	1971 1972	1194.0 1194.0	70.83 * 72.92 *
* 6 * 5	-1 -1	1965 1966			1973 1974	1194.0 1194.0	75.00 * 77.08 *
* 5	-1 -1	1967 1968	1194.0	k 38	1933 1930	1194.0 1194.0	79.17 * 81.25 *
* 5 * 5	-1 -1	1969	1194.0	40 41	1939 1931	1193.9 1193.9	83.33 * 85.42 *
* 5	-ī	1970 1971	1194.0	k 42	1936	1193.9	87.50 *
* 5 * 6	-1 -1	1972 1973	1194.0	44	1940 1961	1193.8 1193.6 1193.5	89.58 * 91.67 *
* 5 * 5	-1 -1	1974 1975	1194.0		1932 1976	1193.5 1193.5	93.75 * 95.83 *
* 7	- <u>î</u>	1976			1934	1193.0	97.92

-DI OTTING	POSTTIONS-	CHILL	DECEDIATE	EL ELIATION
-PI III I I NIS	2115	141111	KESEKVUIK	FLFVALLUN

**************************************			********** ERED EVENTS		ķ
*	RANK	WATER YEAR	ELEV,FT.	WEIRULL	K K
* 9 -1 1930 1193.0 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	123456789012345678901232223		ELEV, FT	PLOT POS 2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.675 20.92 25.00 27.08 29.17 31.33 35.42 37.50 39.567 41.675 43.83 47.92	•
* 5 -1 1954 1194.0 1 * 5 -1 1955 1193.4	25 26 27	1960 1942 1962 1944	1193.6 1193.6 1193.6 1193.6		

*****	555555	-1 -1 -1 -1 -1	1958 1959 1960 1961 1962 1963	1193.4 1193.6 1193.6 1193.5 1193.6	* * * * * *	29 30 31 32 33 34	1943 1951 1973 1950 1967 1948	1193.6 1193.6 1193.6 1193.7 1193.8 1193.9	60.42 62.50 64.58 66.67 68.75 70.83	*****
******	58995999	-1 -1 -1 -1 -1 -1 -1	1964 1965 1966 1967 1968 1969 1970	1193.5 1194.0 1193.9 1193.8 1193.5 1193.6 1193.5 1194.0	* * * * * * * * *	35 36 37 38 39 40 41 42	1956 1947 1938 1974 1966 1941 1971 1965	1193.9 1193.9 1193.9 1193.9 1193.9 1193.9 1194.0	72.92 75.00 77.08 79.17 81.25 83.33 85.42 87.50	*******
*****	5 5 9 6 9	-1 -1 -1 -1 -1	1972 1973 1974 1975 1976	1194.0 1193.6 1193.9 1194.0 1192.6	* * * * *	43 44 45 46 47	1945 1952 1972 1975 1954	1194.0 1194.0 1194.0 1194.0 1194.0	89.58 91.67 93.75 95.83 97.92	* * * * * * * * * * * * * * * * * * * *

_ E1	OTTTNC	POSITIONS-	ATTETM	CLOU
-1-4	HILLING	PUSITIONS-	ALLNIN	FI UM

* * HON		NIS AN YEAR	ALYZED FLO₩,CFS	***	RANK	WATER YEAR	ERED EVENTS FLOW,CFS	WEIRULL PLOT FOS
*	-1 -1 -1 -1 -1 -1 -1 -1 -1	1930 1931 1932 1933 1934 1935 1936 1937 1938 1939	3499. 2180. 2950. 3441. 2444. 3287. 4903. 4031. 11150. 5995.		12 3 4 5 6 7 8 9	1950 1975 1969 1948 1965 1966 1971 1953 1952	21595. 20217. 16309. 14715. 13688. 13314. 13007. 12249. 11428. 11326.	2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.75 20.83
545664445255785	-11111111111111111111111111111111111111	1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953	3422. 10543. 4743. 11201. 10881. 10791. 5977. 6647. 14715. 4045. 21595. 7062. 11428. 12249. 10760.	**************	11 12 13 14 15 16 7 18 19 20 21 22 22 22 22 25	1943 1938 1972 1944 1954 1954 1974 1970 1967 1953 1951 1976	11201. 11150. 11150. 11047. 10881. 10791. 10760. 10543. 9777. 9203. 8065. 7062. 6647. 66423. 6042.	22.92 25.00 27.08 29.17 31.25 33.33 35.42 37.50 37.58 41.67 43.75 45.83 47.92

* 5 -1 1970 9777. * 41 1940 3421. 85.42 * 4 -1 1971 13007. * 42 1935 3287. 87.50 * 4 -1 1972 11047. * 43 1961 3205. 89.58 * 10 -1 1973 8065. * 44 1932 2950. 91.67 * 6 -1 1974 10666. * 45 1958 2511. 93.75 * 5 -1 1975 20217. * 46 1934 2444. 95.83 * 4 -1 1976 6623. * 47 1931 2180. 97.92	***********************	6	-1 -1 -1 -1	1971 1972 1973 1974 1975	13007. 11047. 8065. 10666. 20217.	宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋宋 宋 宋 宋 宋 宋 宋 宋 宋	42 43 44 45 46	1935 1961 1932 1958 1934	3287. 3205. 2950. 2511. 2444.	87.50 89.58 91.67 93.75 95.83	***************
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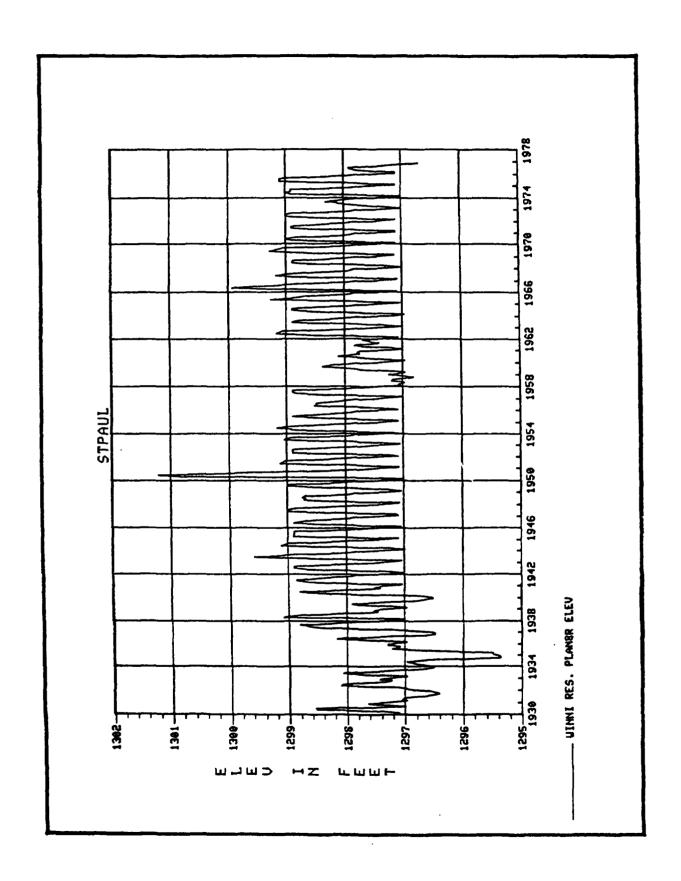
-PLOTI	ING	POSITI	ONS- ANOKA	FLOW *******	*****	*****	******
ķ				ķ	ORDE	RED EVENTS	
אסא	DAY	YEAR	FLOW,CFS	RANK	WATER YEAR	FLOW, CFS	WEIRULL * PLOT POS *
9	-1 -1	1930 1931		1 2 3	1934 1936	610. 627.	2.08 * 4.17 *
¥ 10	-1	1932	1063.	ķ 3	1933	772.	6.25 *
\$ 9 \$ 8	-1 -1	1933 1934		k 4	1935 1976	926. 965.	8.33 * 10.42 *
	-1	1935	926.	k 6	1932	1063.	12.50 *
1 7 2 2 10	- <u>1</u>	1936 1937		k 7 k 8	1937 1931	1150. 1150.	14.58 * 16.67 *
ž 2 k 10	-1	1938	1534.	k 9	1940	1171.	10 75 +
k 10	-1 -1	1939 1940	1701. 1171.	k 10 k 11	1930 1938	1290. 1534.	20.83 * 22.92 *
9	-Ī	1941	2652	K 12	1938 1961	1534. 1667.	25.00 *
1 12	-1 -1	1942 1943	3790.	k 13 k 14	1939 1959	1701. 1819.	20.83
2	-1	1944	4844.	k 15	1962	1836.	31.25
2	-1 -1	1945 1946	3759. 5027.	k 16 k 17	1960 1968	1852. 1883.	33.33 * 35.42 *
12	- <u>1</u>	1947	4383	18	1944	2004.	37.50 *
k 9	-1 -1	1948 1949	4383. 2324. 2473.	18 19 20	1957 1967	2098. 2119.	41.6/ ¥
Ī	-1	1950	2631.	21	1965	2166.	43.75 *
1 12	-î -1	1950 1951 1952	3033. 3 5058. 3	21 22 23	1956 1948	2195. 2324.	45.83 * 47.92 *
2	-1	1953	4415.	k 24	1949	2473.	50.00 *
12	-1 -1	1954 1955		25 26	1958 1950	2563. 2631.	52.08 * 54.17 *
¥ 10	- <u>1</u>	1956	2195.	27	1941	2652.	56.25 *
k 1	-1 -1	1957 1958	2098. 2 2563. 2	k 28 k 29	1963 1971	2752. 2781.	58.33 * 60.42 *
2	-1	1959	1819.	29 30 31 32 33	1951 1955 1970 1969	3033. 3438.	62.50 *
10	-1 -1	1960 1961	1852. 2 1667.	31 32 33	1955	3497•	64.58 *
1	-1	1962	1836.	33	1969	3602.	68.75 *
12 10 10 11 12 11 12 11	-1 -1	1963 1964	2004.	34 35 36	1945 1943	3759. 3790.	70.83 * 72.92 *
1	-1	1965	2166.	36 37	1974	4331.	75.00 *
12	-1 -1	1966 1967	5058. 2 2119. 2	37 38	1947 1953	4383. 4415.	77.08 * 79.17 *
2	-1	1968	1883.	k 39	1944	4844.	81.25 *
12	- <u>1</u>	1969 1970	3602. 3 3497.	k 40 k 41	1942 1946	5005. 5027.	83.33 * 85.42 *
į	- <u>1</u>	1971	2781.	42	1954	5027.	87.50° *
91229	-1 -1	1972 1973	6111. 3 5165. 3	43	1975 1952	5044. 5058.	89.58 * 91.67 *
	-1	1974	4331.	k 45	1966	5058.	93.75 *
10	-1 -1	1975 1976	5044. 7 965. 3	46	1973 1972	5165. 6111.	95.83 * 97.92 *

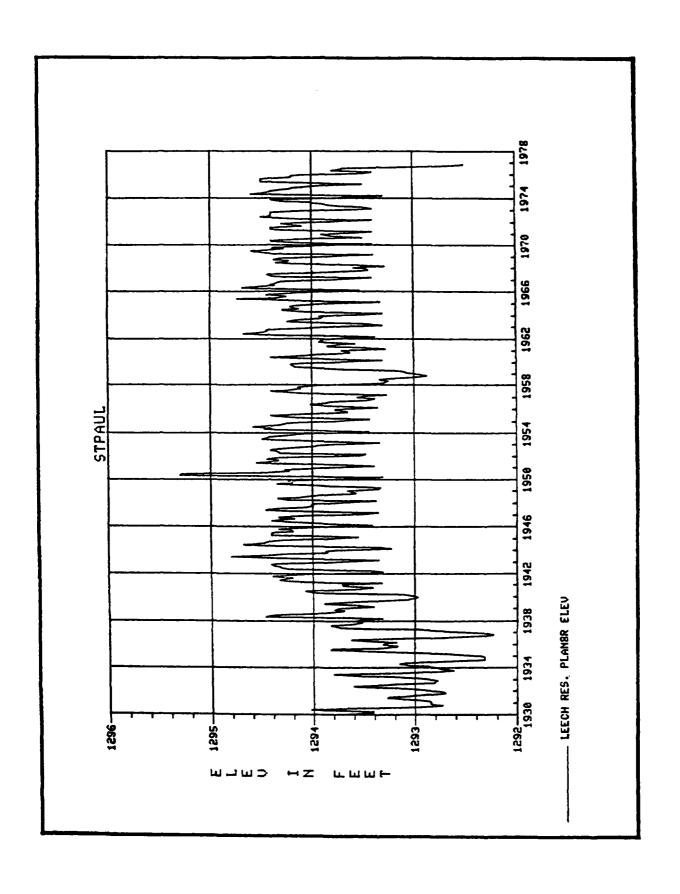
APPENDIX K

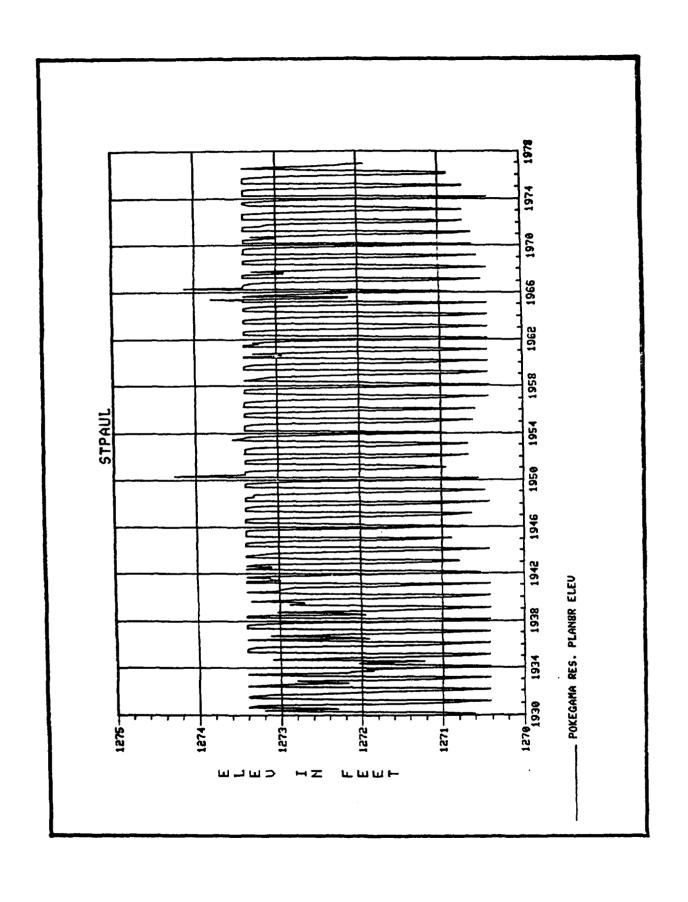
PLAN 8

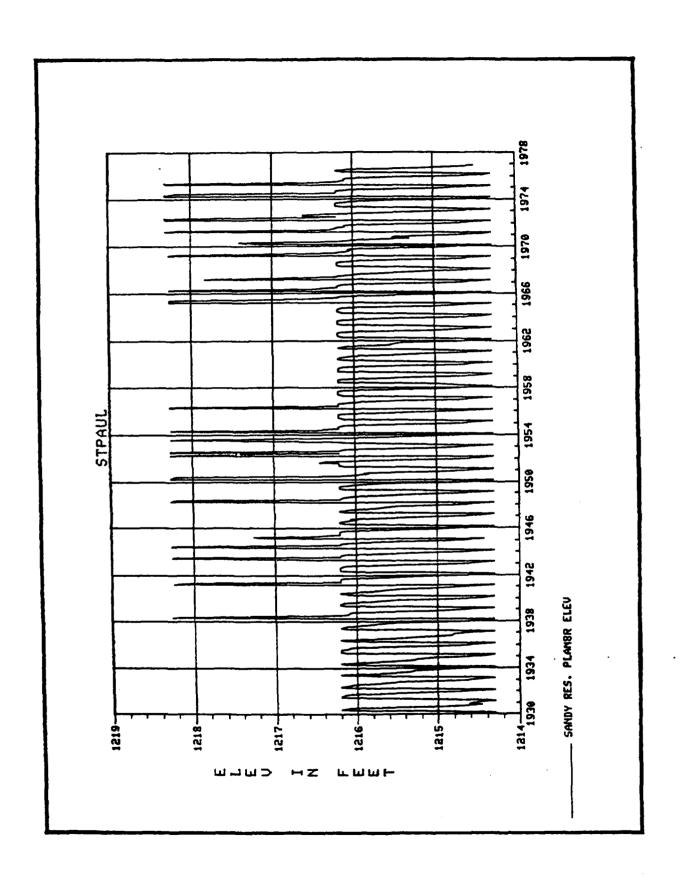
TIME SERIES DATA PLOTS
AND
ANNUAL MAX/MIN DATA TABLES

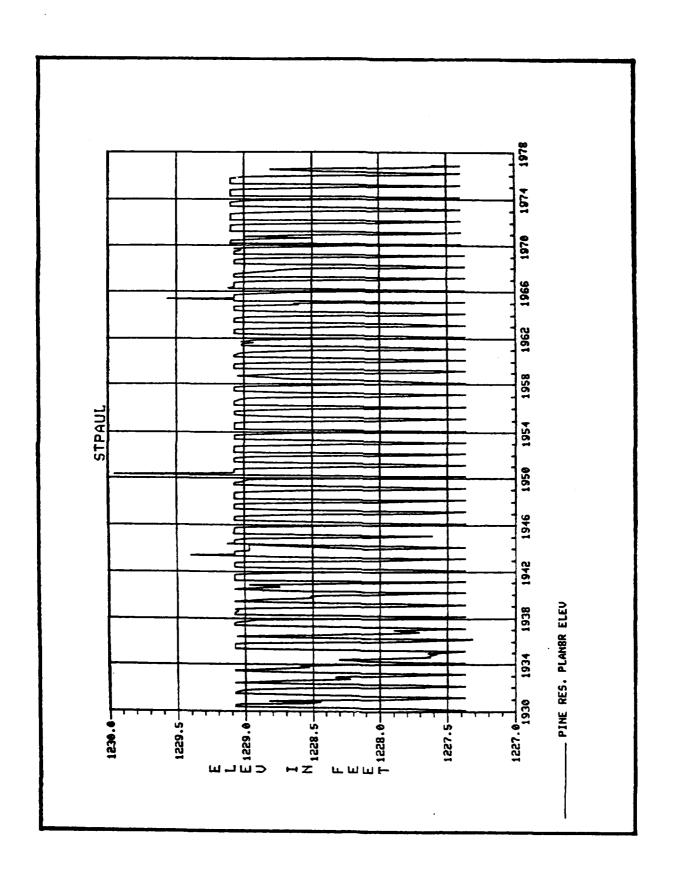
Note: The time series data plots in Appendices E through L are based on the complete period of record used in this study. The annual maximum and minimum data tables are only for the period of 1 May through 30 September for each year. The time series plot may have data values lower than those listed in the minimum data tables.

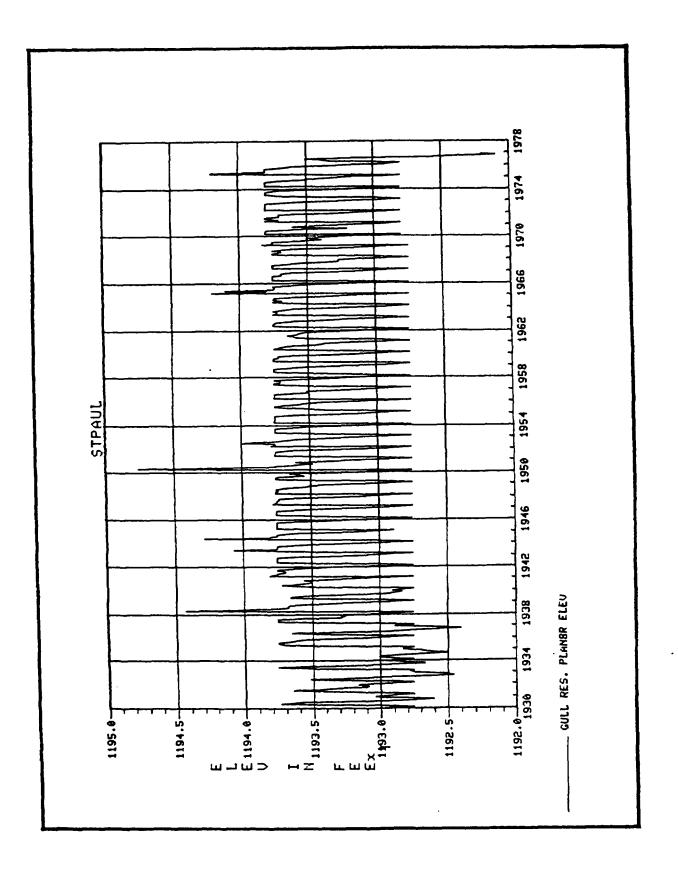


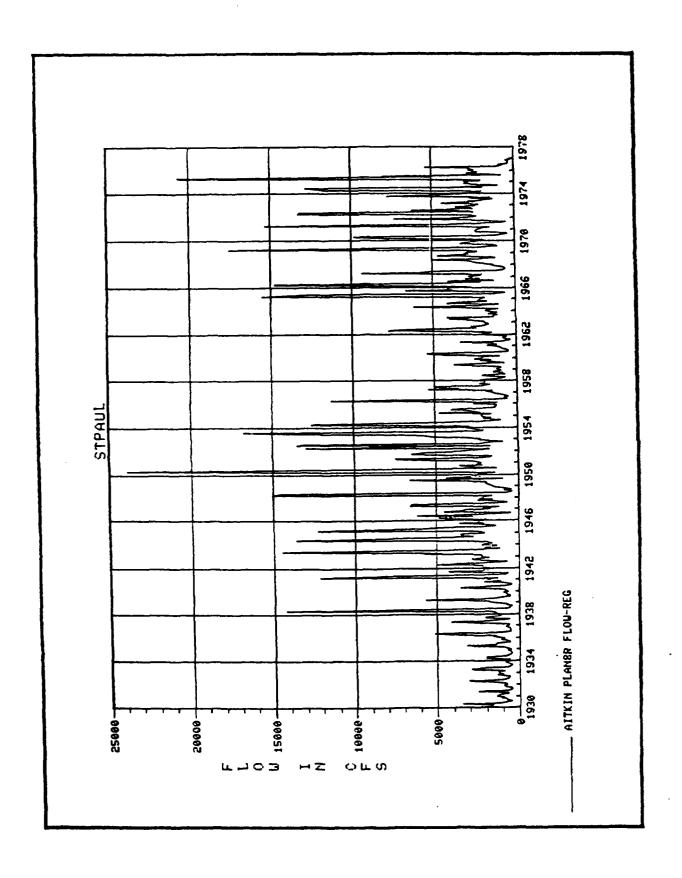


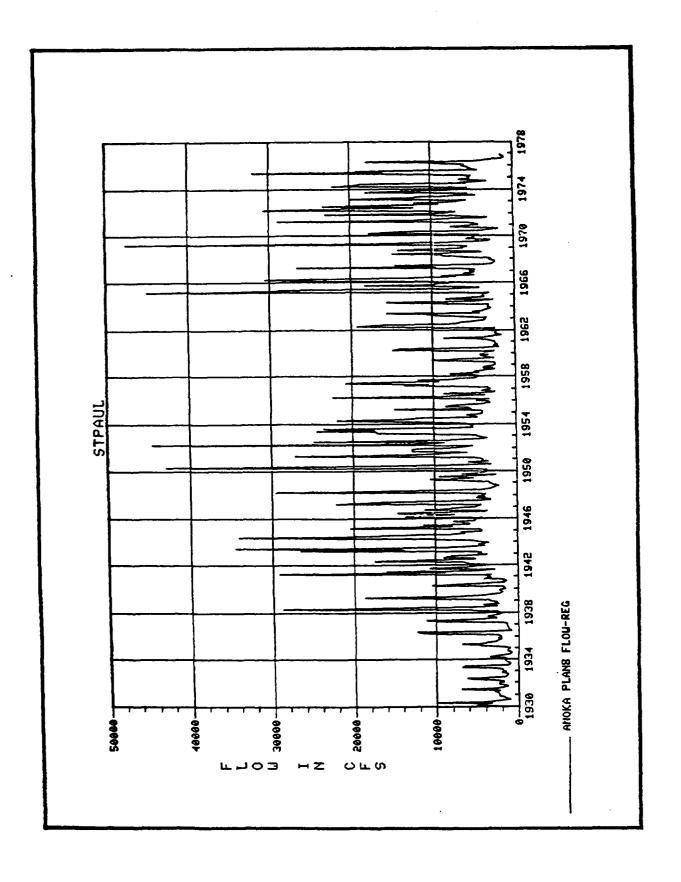












*********	*************************************	**
66766669667 ****	600000	****
-1 -1 -1 -1 -1 -1 -1 -1 ***		***** • • EVE
1966 1967 1968 1969 1971 1972 1973 1974 1975 1976 ****	199333335678901234567890123345678901234567890123345678901233456789012334567890123345678901233456789012334567890123345678901234567890123345678901233456789012334567890123345	****
1299.9 * 1299.3 * 1299.0 * 1299.1 * 1299.1 * 1299.1 * 1299.1 * 1299.1 * 1297.9 * * * * * * * * * * * * * * * * * * *	122998.0 122998.0 122998.0 122998.0 1229978.0 1229978.0 1229978.0 1229978.0 1229978.0 122998.0 1229888.0 122988.0 122988.0 122988.0 122988.0 122988.0 122988.0 1229888.0 122988.0 122988.0 122988.0 122988.0 122988.0 122988.0 12298	
38 39 40 42 43 44 45 47	2345678901234567890123456789012345	*****
1936 1932 1960 1933 1976 1939 1961 1935 1931 1934 1934	196439 196439 196439 1965427 19754 19754 19754 19754 19754 19755 19754 19757 1	******
1298.1 1298.1 1298.0 1297.9 1297.9 1297.8 1297.2 1297.0 1297.0 1297.0	12999999999999999999999999999999999999	TION ********** ERED EVENTS ELEV,FT.
77.08 * 77.125 * 83.33 * 85.42 * 87.50 * 87.567 * 93.75 * 95.83 * 97.92 * * * * * * * * * * * * * * * * * * *	**************************************	WEIBULL * FLOT FOS *

-PLOTTING POSITI	*******	*******	****	*****	
*EVENTS AN * * HON DAY YEAR		RANK	WATER YEAR	ELEV,FT.	WEIBULL FLOT FOS
7 -1 1930 * 9 -1 1931 * 9 -1 1932 * 9 -1 1933 * 9 -1 1934 * 5 -1 1935 * 5 -1 1936 * 7 -1 1938 * 9 -1 1939 * 9 -1 1940 * 9 -1 1941 * 5 -1 1942	1296.4 1297.6 1297.1 1295.9	12	1934 1935 1931 1958 1930 1939 1933 1959 1959 1976 1961 1962	1295.9 1296.1 1296.4 1297.0 1297.0 1297.1 1297.1 1297.2 1297.4 1297.4 1297.6	2.08 4.125 8.332 10.450 14.587 18.822 18.822 225.008

*	_	-1	1943	1298.4	*	14	1949	1297.6	29.17	*
*	5	-1 -1	1944 1945	1298.0 1298.9	*	15 16	1973 1938	1297•6 1297•8	31.25 33.33	*
*	Ს ๑ Ს ७ Ს ๑ Ს ๑ Ს Ს Ს Ს Ს Ს Ს Ს Ს Ს Ს Ს 	-1	1946	1298.5	*	17	1937	1297.9	35.42	*
*	Š	- <u>1</u> - <u>1</u>	1947	1298.5	*	18 19	1953	1298.0 1298.0	37.50	*
¥	<u> </u>	-1 -1	1948 1949	1298.7 1297.6	*	19 20	1963 1940	1298.0 1298.0	39.58 41.67	¥
*	9	-1	1950	1299.5		21	1942	1298.0	43.75	×
*	5	- <u>1</u>	1951 1952	1298.8	*	22	1944 1968	1298.0	45.83	*
¥	7	-1 -1	1952 1953	1298.8 1298.8 1298.0	* * * *	223	1968 1955	1298.1 1298.1	45.83 47.92 50.00	*
*	ş	-1	1954	1298.8	*	25	1964	1298.2	52.08	*
*	5	-1 -1	1955 1956	1298.1 1298.2	*	26 27	1956 1970	1298.2 1298.3	54.17	*
¥	Š	-1 -1	1956 1957	1298.2 1298.3	*****	27 28	1970 1957	1298.3 1298.3	54.17 56.25 58.33	*
*	š	-1	1958	1297.0	*	29	1942	1298.4	60.42	*
*	5	-1	1958 1959 1960	1297.3	*	29 30	1943 1941 1967	1298.4 1298.4 1298.4	60.42 62.50	*
¥	2	-1 -1	1960 1961	1297.6 1297.4	×	31 32	1941	1298.4 1298.4	64.58 66.67	*
*	Ś	-1	1962	1298.4	*	33	1947	1298.5	68.75	*
*	Š	-1	1963	1298.4 1298.0 1298.2	*	34	1947 1946	1298.5	68.75 70.83 72.92	*****************
¥	5	-1 -1	1964	1298.2	****	35	1971	1298.6	72.92	*
Ť	9	-1	1965 1966	1298.7 1299.0	*	36 37	1965 1948	1298.7 1298.7	75.00 77.08	水 业
*	9	-1	1967 1968	1298.4 1298.1 1298.9	*	38 39	1951 1954	1298.8	79.17 81.25 83.33	*
×	5	-1 -1	1968 1969	1298 • 1		39	1954	1298.8 1298.8 1298.8	81.25	*
*	9	-1	1970	1278.7	*	40 41	1952 1972	1298.9	85,42	*
*	ģ	-1	1971	1298.6 1298.9	*	42 43	1969	1298.9 1298.9	87.50 89.58	*
*	9	- <u>1</u>	1972	1298.9		43	1945	1298.9	89.58	*
*	5	-1 -1	1973 1974	1297.6 1298.9	*	44 45	1974 1975	12°8.9 1298.9	91.67 93.75	*
*	Š	-ī	1975 1976	1298.9 1297.4	*	46	1966	1299.0 1299.5	95.83	*
*	*****	-1	1976	1297.4	*	46 47	1950	1299.5	95.83 97.92	*

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7 67 69 65 5****	HDN 6 6	****
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1294.6 1294.4 1294.4 1294.0 1294.6 1294.6 1293.8 *******	ELEV. 134.8 12993.3.3.4.9.1 12993.3.3.3.4.9.1 12993.3.3.3.4.9.1 12999.3.3.3.3.4.9.1 12999.4.4.4.9.1 12999.4.4.4.9.1 12999.4.4.4.9.1 12999.4.4.4.9.1 12999.4.4.9.1 12999.4.4.9.1 12999.4.4.9.1 12999.4.4.9.1 12999.4.4.9.1 12999.4.4.9.1 12999.4.4.9.1 12999.4 12999.4 12999.4 12999.4	
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40 41 42 43 45 45 46 47 *****	RANK 1234567890112345678901123456789	
1935 1933 1976 1936 1932 1958 1931 1934	TYPE 1944 62 1955 70 25 70 195	******* •••• UATER
1293.8 1293.8 1293.6 1293.6 1293.6 1293.3 1293.3 1293.1 ********	ELEV, FT. 387777766666555544.44.44.44.44.44.44.44.44.44.44.44.	TION ********** ERED EVENTS
83.33 85.42 87.50 87.58 91.67 93.75 95.83 97.92 ******	BERT 101-23-45-53-2087	
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122222222233333333344444444444444444444	RANK 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
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1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1272.7 1273.4 1273.4 1273.4 1273.4 1273.4	ELEV, FT. 1271.2 1271.9 1271.9 1272.1 1272.1 1272.2 1272.3 1272.3 1272.3 1272.7 1272.7 1272.7
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44 45 46 47 *****	1234567890123456789012345678901234567890123	RANK
1946 1942 1976 1961	19445 19445 1975 1975 1975 1975 1976 1976 1976 1976 1976 1976 1976 1976	WATER YEAR
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91.67 93.75 95.83 97.92	87532087553208755320875520875087508750875087508750875087508750875	PLOT PO
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PLOTTING POSITIONS— SANDY RESERVOIR ELEVATION ***********************************	****************	****************	* * *
**************************************	9599975999	9999999955556999	• • • •
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	\$\\ 32087520875208752087520875208752087520875	2.08 4.125 4.125 6.3320 10.5567 12.5567 14.567 14.567 12.5920 14.5920 14.5920 15.3420 15.3420 15.3420 15.3420	WEIRULL PLOT POS

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T1** N-6766666566566565656565657569666666655555555
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ION **ENT :
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*	***	****	*****	ONS- PINE R ************************************	*****	*****	ION ********* ERED EVENTS	********* WEIBULL	(* * *
*	нон	DAY	YEAR	ELEV,FT.	* RANK		ELEV, FT.		¥
不市方 米 米 木 本 本 本 本 本 本 本 本 本 本 本 本 本 本 本 本 本	๛๛๛๛๛๛๛๛๛๛๛๛๛๛	-11 -11 -11 -11 -11 -11 -11 -11 -11 -11	1931234 193335 199335 199335 199337 199337 19944 19944 19955 19951 19951 19951	1228.1 1228.4 12228.4 12228.67 122228.7	12345678901234567890123 11111111112222	1934 1976 19738 197336 197336 197330 19730 19730 197561 19744 19747 19757 19740 19737	1227.6 1227.9 1228.0 1228.1 1228.4 1228.5 1228.5 1228.6 1228.6 1228.7 1228.7 1228.7 1228.7 1228.7 1228.7	45.83	· 字字末字字末字末末末末末末末末末末末末末末末末末末末末末末末末末末末末末末

* 5 -1 1965 1229.1 * 36 1965 1229.1 75.00 * 6 -1 1966 1229.1 * 37 1966 1229.1 77.08 * 9 -1 1967 1228.9 * 38 1954 1229.1 79.17 * 5 -1 1973 1228.7 * 39 1948 1229.1 81.25 * 8 -1 1969 1229.0 * 40 1941 1229.1 83.33 * 9 -1 1970 1228.5 * 41 1950 1229.1 85.42 * 5 -1 1971 1229.1 87.50 85.42 * 5 -1 1972 1229.1 87.50 * 5 -1 1972 1229.1 89.58 * 5 -1 1973 1228.7 * 44 1952 1229.1 91.67 * 5 -1 1974 1229.1 * 45 </th <th>********</th> <th>5556555555555</th> <th>-1 -1 -1 -1 -1 -1 -1 -1</th> <th>1953 1954 1955 1956 1957 1958 1959 1960 1961 1962</th> <th>1228.7 1229.1 1228.6 1229.7 1228.7 1228.4 1228.7 1228.7 1228.7</th> <th>******</th> <th>24567899012334 222333334</th> <th>1960 1942 1962 1963 1968 1973 1967 1969</th> <th>1228.7 1228.7 1228.7 1228.7 1228.7 1228.7 1228.7 1228.7 1228.9 1229.0</th> <th>50.00 52.08 54.17 56.23 50.50 62.50 64.58 66.67 68.77</th>	********	5556555555555	-1 -1 -1 -1 -1 -1 -1 -1	1953 1954 1955 1956 1957 1958 1959 1960 1961 1962	1228.7 1229.1 1228.6 1229.7 1228.7 1228.4 1228.7 1228.7 1228.7	******	24567899012334 222333334	1960 1942 1962 1963 1968 1973 1967 1969	1228.7 1228.7 1228.7 1228.7 1228.7 1228.7 1228.7 1228.7 1228.9 1229.0	50.00 52.08 54.17 56.23 50.50 62.50 64.58 66.67 68.77
* 6 -1 1966 1229.1 * 37 1966 1229.1 77.08 * 9 -1 1967 1228.9 * 38 1954 1229.1 79.17 * 5 -1 1969 1229.0 * 40 1941 1229.1 81.25 * 8 -1 1969 1229.0 * 40 1941 1229.1 83.33 * 9 -1 1970 1228.5 * 41 1950 1229.1 85.42 * 5 -1 1971 1229.1 * 42 1971 1229.1 87.50 * 5 -1 1972 1229.1 * 43 1972 1229.1 89.58 * 5 -1 1973 1228.7 * 44 1952 1229.1 91.67 * 5 -1 1974 1229.1 * 45 1974 1229.1 93.75 * 5 -1 1975 1229.1 * 46 1975 1229.1 95.83	*	5 5	-1 -1	1963 1964	1228.7 1228.7	*	34 35	1956 1938	1229.0 1229.0	70.83 72.92
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1193.4 1193.4 1193.55555555577554 11193.5555775554 11193.555775511193.557 11193.557 11193.557 11193.57 11193.68 11193.68	ELEV, FT. 1192.8 1192.6 1192.5 1192.5 1192.5 1192.5 1193.5 1193.5 1193.5 1193.5 1193.5 1193.5 1193.5 1193.6 1193.6 1193.6 1193.6 1193.6 1193.6 1193.6	
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1964 1966 1966 1996 1996 1996 1996 1996	#YEAR	ORDE
11993333333333333333333333333333333333	ELEV-FT. 119-5-6-6-7-8-9-0-2-2-4-4-4-5-5-5-5-5-5-5-5-5-5-5-5-5-5-5	********** ERED EVENTS
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81.25 83.32 85.42 87.50 89.58 91.65 95.83 97.92	2.087 4.2332 4.2332 10.557 10.	WEIRULL PLOT POS
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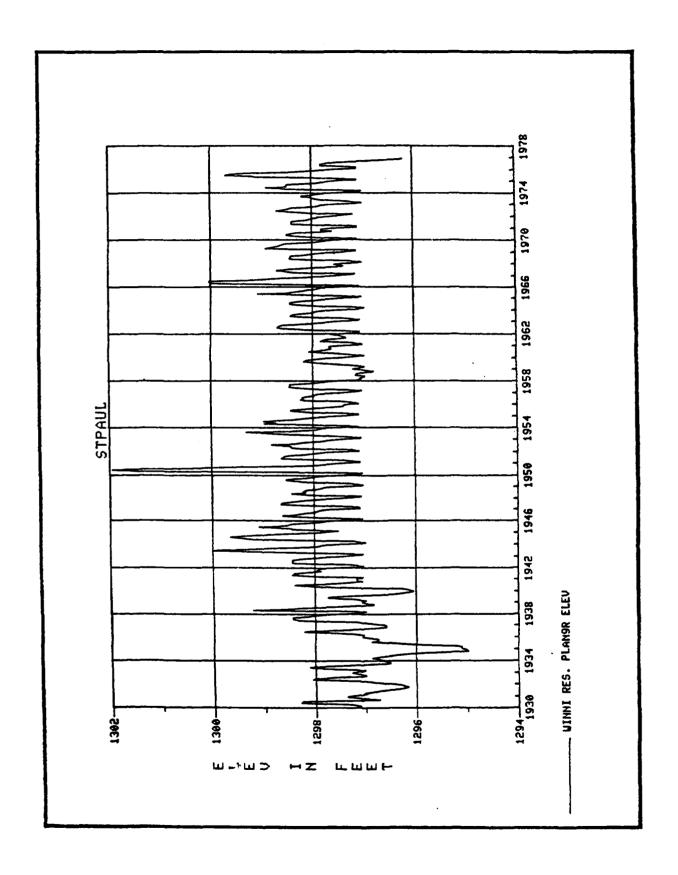
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* MON DAY YEAR FLOW, CFS * RANK YEAR FLOW, CFS PLOT FOS *				ጙጙጙዯኍዯኍኍ ፟			
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* 10 -1 1932 1263. * 3 1933 971. 6.25 * 9 -1 1933 971. * 4 1935 1030. 8.33 * 8 -1 1934 810. * 5 1976 1048. 10.42 * 7 -1 1936 827. * 7 1932 1263. 14.58 * 1 -1 1937 1307. * 8 1937 1307. 16.67 * 1 -1 1938 2061. * 9 1931 1347. 18.75 * 10 -1 1938 2061. * 9 1931 1347. 18.75 * 10 -1 1938 2061. * 9 1931 1347. 18.75 * 10 -1 1938 2061. * 9 1931 1347. 18.75 * 20 -1 1941 2827. * 12 1970 1858. 25.00 * 1 -1 1942 3553. *				¥			
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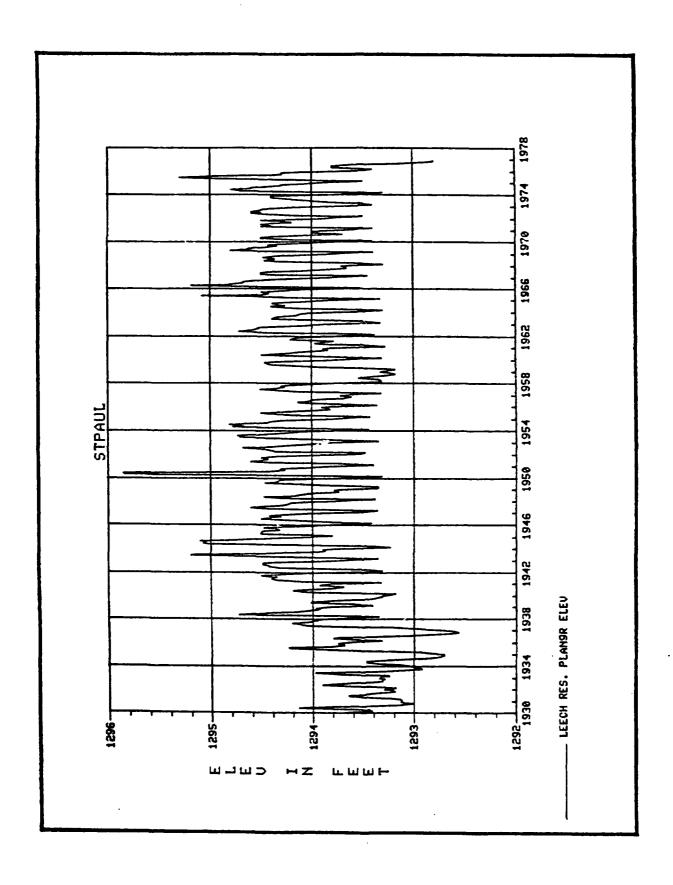
APPENDIX L

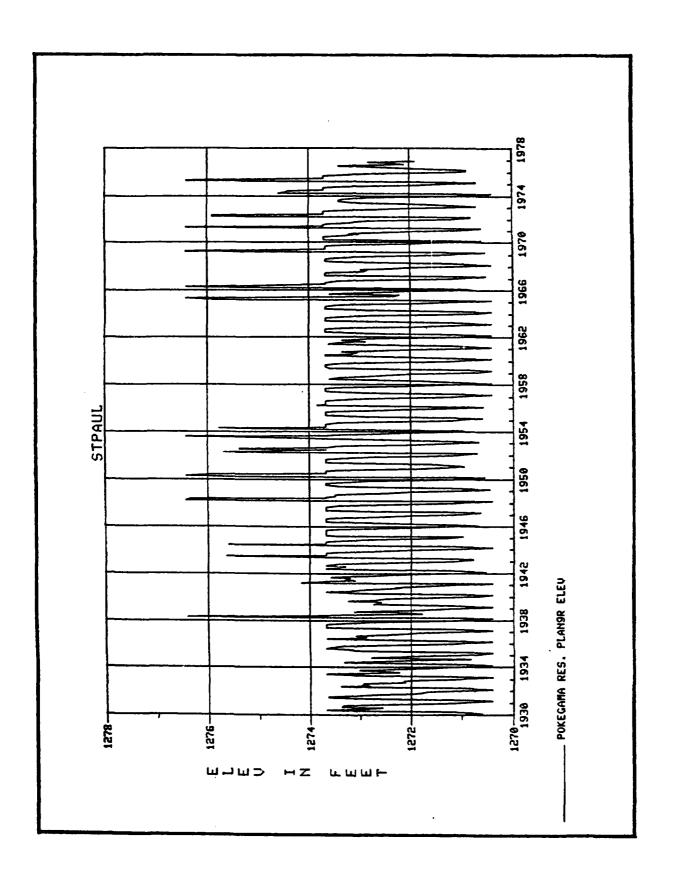
PLAN 9

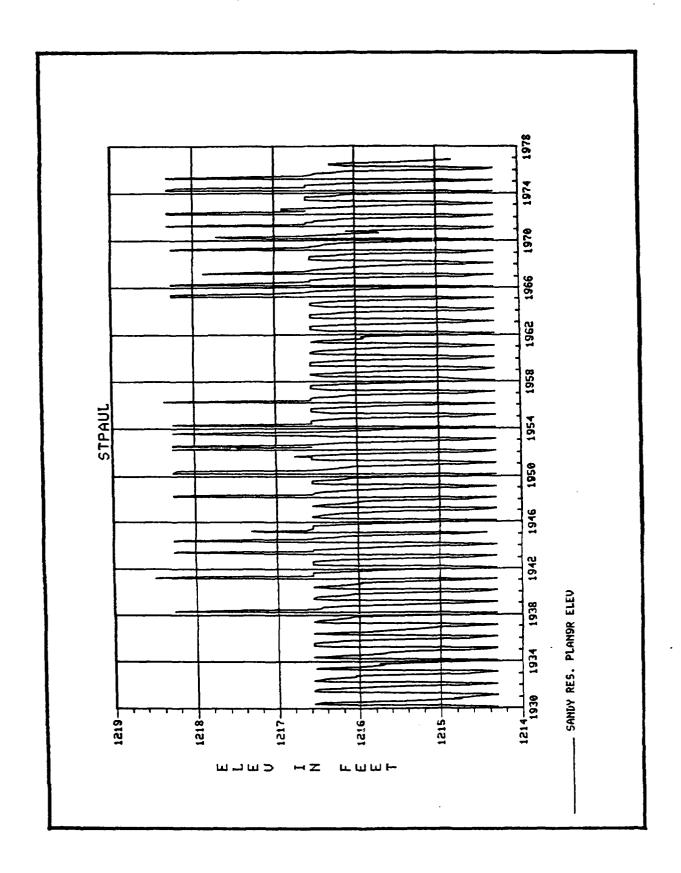
TIME SERIES DATA PLOTS
AND
ANNUAL MAX/MIN DATA TABLES

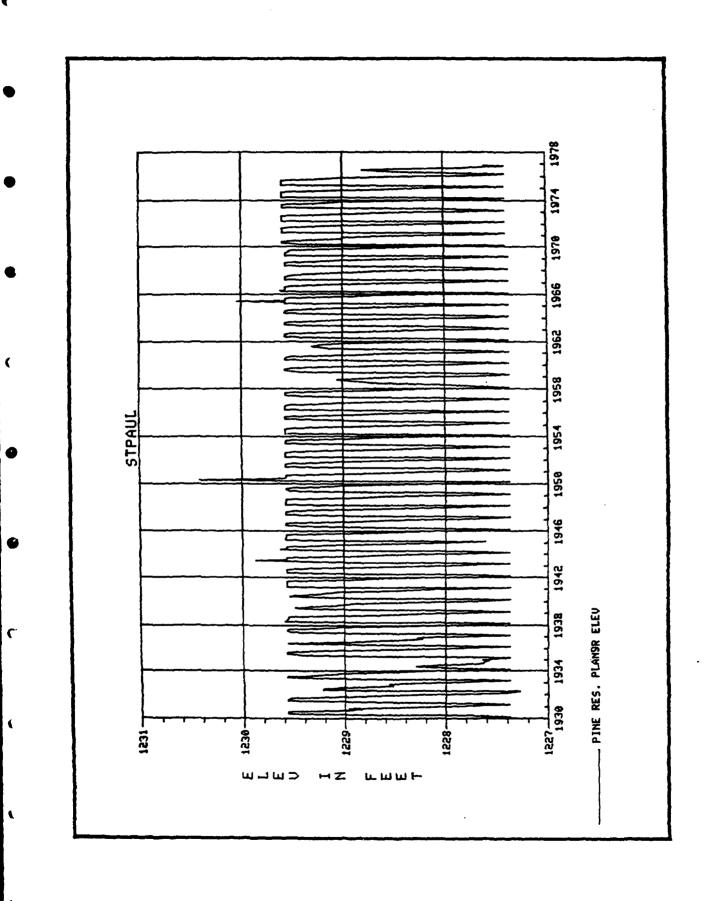
Note: The time series data plots in Appendices E through L are based on the complete period of record used in this study. The annual maximum and minimum data tables are only for the period of 1 May through 30 September for each year. The time series plot may have data values lower than those listed in the minimum data tables.

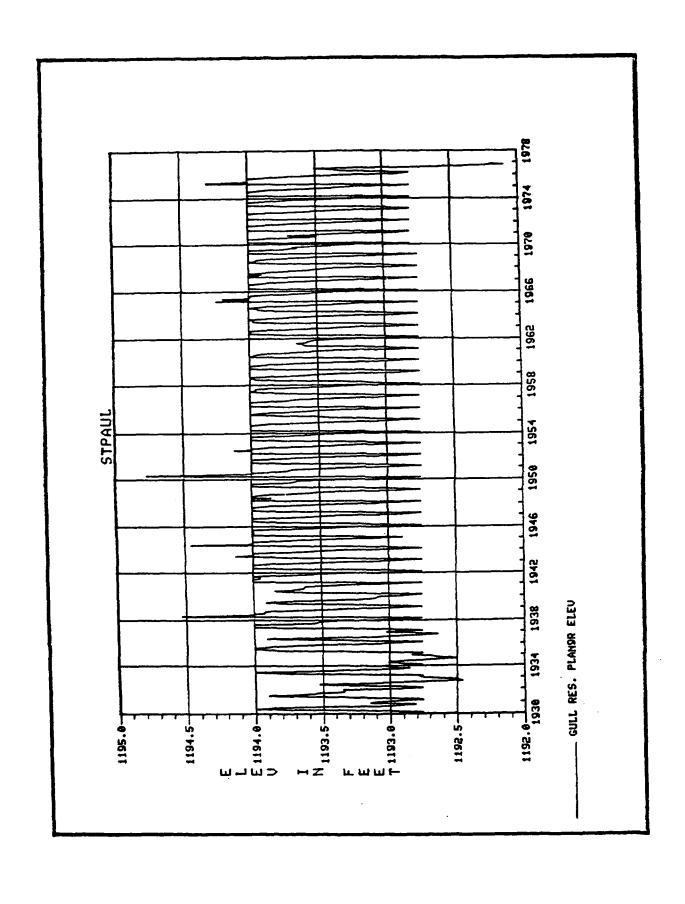


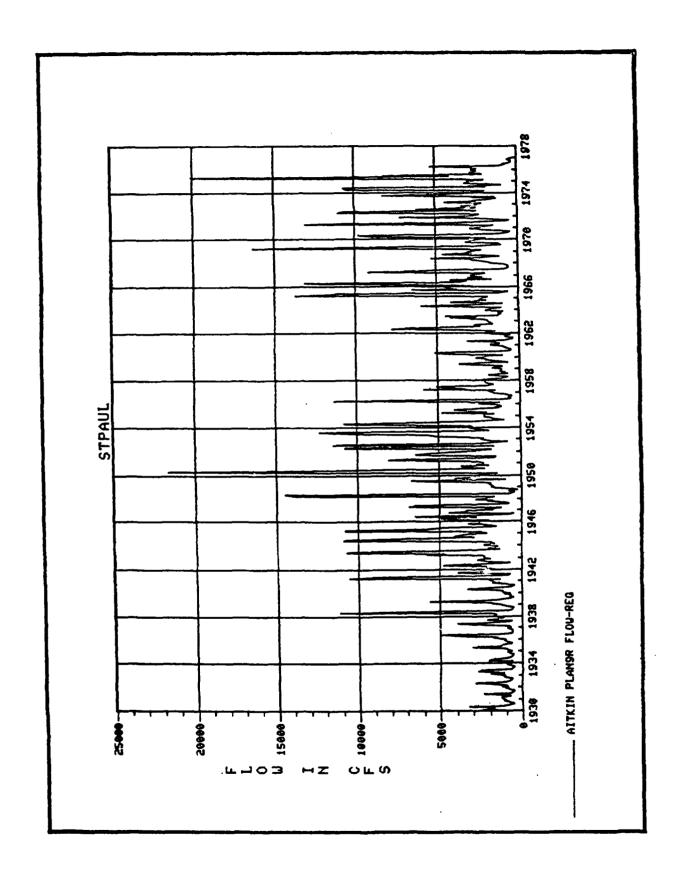


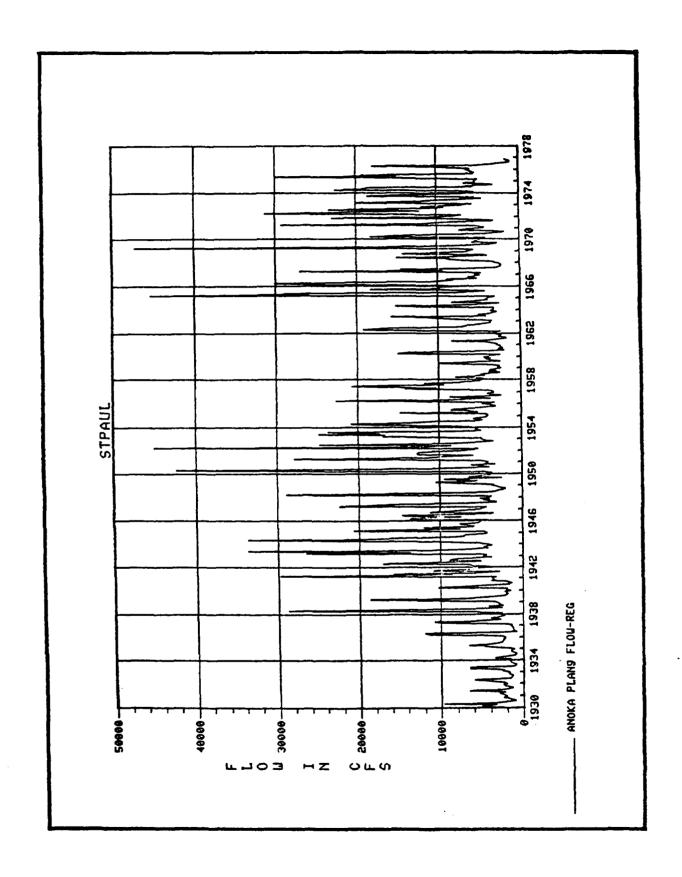












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-PLC	DALLEC	POSITIONS-	UINNI	RESERVOIR	ELEVATION
------	--------	------------	-------	-----------	-----------

				*********** ALYZED			ORD	********** ERED EVENTS	
*	אסא	DAY	YEAR	ELEV,FT.	*	RANK	WATER YEAR	ELEV,FT.	WEIRULL PLOT POS
**********	99999595959	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1	1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941	1296.7 1296.7 1297.1 1295.8 1295.7 1297.0 1297.8 1297.3 1297.6 1297.6	**********	12 3 4 5 6 7 8 9 10 11 12	1935 1934 1931 1939 1933 1958 1936 1932 1976 1959 1938	1295.7 1295.8 1296.2 1296.6 1296.7 1297.0 1297.0 1297.1 1297.1 1297.2 1297.2	2.08 4.17 6.25 8.33 10.42 12.50 14.58 16.67 18.75 20.92 22.92
***	5 5 5 5	-1 -1 -1 -1	1942 1943 1944 1945	1298.0 1298.3 1297.9 1298.4	***	13 14 15 16	1961 1960 1940 1949	1297.3 1297.6 1297.6 1297.6	27.08 29.17 31.25 33.33

****************	95759595955555555559955999	-11-11-11-11-11-11-11-11-11-11-11-11-11	1946 1947 1948 1949 1950 1951 1953 1953 1955 1956 1966 1966 1966 1966 1968 1969	1298.0 1298.2 1298.6 1298.6 1298.4 1298.4 1297.1 1297.1 1297.1 1297.0 1297.0 1297.0 1297.0 1297.0 1297.0 1298.5	****************	1789 12222222222233333356789 12222222222333333333333333333333333333	1973 1973 1973 1973 1973 1973 1973 1975 1975 1975 1975 1975 1975 1975 1975	12977.8 12977.8 12977.8 12977.8 12977.9 12977.9 12977.9 12978.0 12978.1 12978.1 12978.1 12978.1 12978.1 1298.3 1298.4	**************************************
*	5	-1	1964	1297.8		35	1948	1278 • 2	72,92 *
*	9		1966	1299.0	*	37	1763 1947	1278.2	77.08
*	9	-1	1967	1297.9	*	38	1943	1298.3	79.17 *
¥	5	-1	1968	1298.0		39	1954	1298.4	81.25 ¥
*	ý	-1	1970	1297.8	*	41	1972	1298.4	85.42 *
*	9	-ī	1971	1298.1	*	42	1945	1298.4	87.50 *
*	9	-1	1972	1298.4	*	43	1974.	1298.5	89.58 *
¥	5	-1	1973	1297.6	*	44	1969	1298.5	91.67 * 93.75 *
Ŧ	2	-1 -1	1974 1975	1298.5 1299.1	¥	45 46	1966 1975	1299.0 1299.1	93.75 * 95.83 *
ī	9 5 5 5 9	-1	1976	1297.1	Ŷ	47	1950	1299.4	97.92 *
*	****	****	*****	*****	***	******	******	******	*******

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19548 19548 19548 197548 19964 19964 19965 11997 11996 11995	YEAR 1934 1933 1930 1976 1958 1931 1935 1949 1959 1973 1973 1961 1940 1937 1967	******* ORDE WATER
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1976 1934 1939	URX 1956695818243424567902343780725695818245611832
1273.4 1273.3 1273.3	ELEV.FT. 1276.4 1276.4 1276.4 1276.4 1276.4 12775.8 12775.8 12775.7 12773.7 1
93.75 95.83 97.92	**************************************
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**************************************	**************************************	MA RESERV ******** *
1936 1960 1961 1962 1963 1964 1973 1940 1947 1974 1974 1975 1975 1975 1975 1975 1975 1975 1975	1934 1938 1938 1939 1976 1935 1935 1955 1957 1948 1932 1948 1930 1954 1953 1955 1953	OIR ELE
1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1272.8 1273.0 1273.0 1273.7 1273.7 1273.7 1273.7 1273.7 1273.7 1273.7	1270.8 1271.8 1271.9 1271.9 1272.1 1272.2 1272.2 1272.2 1272.3 1272.5 1272.6 1272.6 1272.8 1272.8 1272.8 1272.8 1272.8	VATION ******** RED EVENTS ELEV,FT.
**************************************	WEIRULL #PLOT POS # 2.08	
		ķ

*******	******	ONS- SANDY	RESERVOIF	******	********	*****
* HON DAY	YEAR	ELEV,FT.	RANK	WATER YEAR	ELEV,FT.	WEIBULL * PLOT POS *
*EVE	ENTS AN	ELEV,FT. 1216.6 1216.6 1216.6 1216.6 1216.6 1216.6 1216.6 1218.3 1216.6 1218.3 1216.6 1218.3 1216.6 1218.3 1216.6 1218.3 1216.6 1218.3 1216.6 1218.3 1216.6 1218.3 1216.6 1218.3	*** *** *** *** *** *** *** *** *** **	ORDI	ERED EVENTS ELEV.FT. 1218.3	**************************************
* 6 -1 * 6 -1 * 5 -1 * 5 -1 * 5 -1 * 5 -1	1963 1964 1965 1966 1967 1968 1969	1216.6 1216.6 1218.3 1218.3	K 34 K 35 K 36 K 37 K 38 K 39 K 40	1964 1939 1940 1968 1946 1947 1934	1216.6 1216.6 1216.6 1216.6 1216.6 1216.6	70.83 * 72.92 * 75.00 * 77.08 * 79.17 * 81.25 * 83.33 *
* 5 -1 * 5 -1 * 5 -1 * 6 -1 * 5 -1 * 5 -1	1970 1971 1972 1973 1974 1975	1218.3 1216.6 1218.3	k 41 k 42 k 43 k 44 k 45 k 46	1942 1973 1931 1932 1961 1933	1216.6 1216.6 1216.6 1216.6 1216.5 1216.5	85.42

1216.3
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24 25 26 27 28 29
1216.3
*

-PLOTTING POSITIONS-	FINE	RESERVOIR	ELEVATION
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	TLUI			UNS- FINE KI	-25KA01K	CUCVMI	10U	*****
4	****			(********** ALYZED	******** *		ERED EVENTS	
4		•••	EN12 HU	HF 1750++++	*****	WATER	EKED EASUIS	
1	KON	אמ	YEAR	ELEV,FT.	RANK	YEAR	ELEV,FT.	WEIRULL * PLOT POS *
1	, 11014 ,	וחע	IEAN	EFEALL	*			
7	4	-1	1930	1229.6	. 1	1950	1230.4	2.08 *
i	2 6	-1		1220.4	k 1 k 2	1965	1230.0	4.17 *
i		-i	1932		k 3	1943	1229.9	∂.25 ¥
i		-i	1933		k 4	1944	1229.6	8.33 *
i	, ,	-1	1934			1966	1227.6	10.42 *
i	, 9	-i	1935	122013	. 6	1938	1227 6	12.50
i	·	-i	1936		\$ 5 \$ 6 \$ 7	1945	1229.6	14.58
*	; ;	-i	1937	1229.6	k á	1937	1229.6	16.67
i	; '	-i	1938	1220.4	ķ 9	1935	1229.6	18.75
×	7	-1	1939		i 10	1941	1229.6	20.83
*	: 1	-1	1940	1229.5	iii	1942	1229.6	22.92
i		-1	1941		12	1933	1229.6	25.00 *
1	; ;	-1	1942	1229.6	13	1946	1229.6	27.08
i	2	-i	1943		14	1947	1220.4	29.17
1	2	-i	1944		15	1948	1229.6 1229.6	31.25
i	, E	-1	1945		16	1949	1229.6	33.33 *
- ;	; ;	-1	1946		17	1930	1229.6	35.42 *
ž	4	-i	1947		18	1951	1229.6	37.50 ₮
i	` `	-i	1948	1229.4	19	1952	1229.6	37.50 * 39.58 *
7	7	-î	1949		ž 20	1953	1229.4	41.67
3	Ś	-î	1950	1230.4	Ži	1954	1229.6	43.75
ž	Ă	-i	1951		22	1955	1229.6	45.83 *
ì	=	-î	1952	1229.6	23	1956	1229.6	47.92
ż		-1	1953	1229.6	24	1957	1229.6	50.00 *
*	. Š	-ī	1954		k 25	1959	1229.6	52.08 *
*	7	-1	1955	1229.6	k 26	1960	1229.6	54.17 *
*	5	-1	1956	1229.6	27	1962	1229.6	56.25 #
*	7	-1	1957	1229.6	k 28	1963	1229.6	58.33 *
*	9	-1	1958	1228.9	29	1964	1229.6	60.42 *
*		-1	1959	1229.6	× 30	1931	1229.6	62.50 *
*		-1	1960	1229.6	31	1967	1229.6	64 . 58 *
*		-1	1961	1229.3	k 32	1968	1229.6	66.67 *
*	6	-1	1962	1229.6	33	1969	1229.6	68.75 *
*	6 7 6	-1	1963	1229.6	K 34	1970	1229.6	70.83 *
*	6	-1	1964	1229.6	k 35	1971	1229.6	72.92 *
*	6	-1	1965	1230.0	<u>36</u>	1972	1229.6	75.00 *
*	5	-1	1966	1229.6	<u> 37</u>	1973	1229.6	77.08 *
*	Ş	-1	1967	1227+6	38	1974	1229.6 1229.6 1229.6	79.17 *
*	2	-1	1968	1229+6	39	1975	1227.6	81.25
1	٥	-1	1969		40	1936	1229.6	83.33 *
*	2	-1	1970	1229 6	k 41 k 42	1940	1229.5	85.42 *
į	5	-1 -1	1971		k 42 k 43	1939 1961	1229.5 1229.3	87.50 * 89.58 *
4	3	-1	1972 1973	1229.6	43	1932	1227.3	91.67
*	6556555575	-1	1974		45	1958	1228.9	93.75
*	Ę	-1	1975	1229.6	46	1976	1228.8	95.83 *
ž	5 7	-i	1976		47	1934	1228.3	97.92
ž			******		• •		********	
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-PLOTTING	POSITIONS-	PINE	RESERVOIR	ELEVATION
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1958 1958 1959 1960 1962 1963 1964 1965 1966 1971 1971 1977 1977	1930 19332 19333 19335 19335 19336 19338 19339 19442 19443 19445 19449 1953 1953 1953 1953 1953 1953 1953 195	POSITI ****** ENTS AN YEAR
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1228.9 1228.9 1228.9 1228.9 1229.0 1229.5 1229.5 1229.6 1229.6 1229.6 1229.6 1229.6	127.6 1227.9 1228.0 1228.6 1228.6 1228.7 1228.7 1228.7 1228.7 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9 1228.9	********** ERED EVENTS ELEV,FT.
56.42.58 64.587 64.587 772.90 64.587 777.08 83.42 89.587 89.587 89.587 93.75	2.08 4.12 3.32 1058 1058 11465 11683 11683 11683 11683 11683 11683 11683 11683 11683 11683 11733	WEIRULL
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				ONS- GULL R				*****
*				ALYZED		ORDE	RED EVENTS	* * * * * * * * * *
*	KON	πΔΥ	YEAR	ELEV,FT.	* * Rank	WATER YEAR	ELEV,FT.	WEIBULL * PLOT POS *
*	\				*			*
*		-1 -1	1930 1931	1194.0 1193.9	* 1 * 2 * 3 * 4	1950 1938	1194.8 1194.5	2.08 * 4.17 *
*	6	-1	1932	1193.5	¥ 3	1944	1194.4	6.25 *
*	6657	-1 -1	1933 1934			1975 1965	1194.3 1194.2	8.33 * 10.42 *
*	7	-1	1935	1194.0	* 5 * 6 * 7	1943	1194.1	12.50 *
*	6	-1	1936	1193.9	* 7	1952	1194.1	14.58 *
*	5	-1 -1	1937 1938		* B * 9	1937 1941	1194.0 1194.0	16.67 * 18.75 *
*	7	-ī	1939	1193.9	* 10	1942	1194.0	18.75 * 20.83 *
*	6	-1 -1	1940 1941	1193.8 1194.0	* 11 * 12	1935 1945	1194.0 1194.0	22.92 * 25.00 *
*	6	-1	1942	1194.0	* 13	1946	1194.0	27.08 *
*	6	-1	1943		* 14	1947 1948	1194.0	20.83 * 22.92 * 25.00 * 27.08 * 29.17 * 31.25 *
*	5	-1 -1	1944 1945	1194.0	* 15 * 16	1949	1194.0 1194.0	33.33 *
*	7	-1	1946	1194.0	* 17	1951	1194.0	35.42 *
*	6	-1 -1	1947 1948		* 18 * 19	1953 1954	1194.0 1194.0	37.50 * 39.58 *
1	6	-1	1949	1194.0	* 20	1955	1194.0	41.67 *
*	6576566657656567	-1 -1	1950 1951	1194.8 1194.0	* 21 * 22	1956 1957	1194.0 1194.0	41.67 * 43.75 * 45.83 *
	7	-i	1952	1194.1	* 23	1958	1194.0	47.92 *
*	. 6	-1	1953	1194.0	* 24 * 25	1959	1194.0	50.00 *
*		-1 -1	1954 1955	1194.0 1194.0	26	1960 1962	1194.0 1194.0	52.08 * 54.17 *
*	5	-1	1956	1194.0	¥ 27	1963	1194.0	56.25 *
*	7	-1 -1	1957 1958	1194.0 1194.0	k 28 k 29	1964 1966	1194.0 1194.0	58.33 * 60.42 *
*	ĕ	-ī	1959	1194.0	¥ 30	1967	1194.0	62.50 *
*	6	-1 -1	1960 1961	1194.0 1193.6	31 32	1968 1969	1194.0 1194.0	64.58 * 66.67 *
į		-1	1962	1194.0	k 33	1970	1194.0	68.75 *
*	9	-1 -1	1963		k 34 k 35	1971	1194.0	70.83 *
•		-1	1964 1965		k 35 k 36	1972 1973	1194.0 1194.0	72.92 * 75.00 *
*	5	-Ĭ	1966	1194.0	\$ 37	1974	1194.0	77.08 *
*	3	-1 -1	1967 1968		* 38 * 39	1933 1930	1194.0 1194.0	79.17 * 81.25 *
*	Ś	-1	1969	1194.0	k 40	1939 1931	1193.9 1193.9	83.33 *
*	5	-1 -1	1970 1971	1194.0	41	1931 1936	1193.9 1193.9	85.42 * 87.50 *
*	: Š	-1	1972	1194.0	43	1940	1193.8 1193.6	89.58 *
*	6	-1	1973	1194.0	k 44	1961	1193.6	91.67 *
*	=	-1 -1	1974 1975		k 45 k 46	1932 1976	1193.5 1193.5	93.75 * 95.83 *
*	7	-1	1976	1193.5	47	1934	1193.0	97.92 *
*	****	***	*****	********	*******	******	******	******

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		**1
9333333333399999 9333333333399999 94494	7 - 22 1992 1993 1993 1993 1993 1993 1993 19	*** EV
6789999999000000	56690014445555555666666666666666666666666666	** EN
***		*** TS.
6466802777788888999957*	2 4 6 8 10 12 14	*** WEI PLO
56789001234556789	-0123455678900123455678900123	** BU
87532087532087532	-8753208753208753208753208753	*** LL POS
**************		**

*****	****	ONS- AITKIN ********** ALYZED	*******		********* ERED EVENTS FLOW,CFS	
	1930 1931 1932 1933 1933 1933 1933 1933 1940 1941 1944 1944 1944 1950 1951 1953 1955 1955 1955	2323. 2784. 2657. 1984. 2987. 4903. 3931. 11150. 5576. 3322. 10529. 4743. 10685. 10881. 10774. 6414. 6414. 6457. 21595. 8050. 114289. 10760.	**************************************	1975 1975 1976 1976 1976 1976 1976 1975 1975 1974 1977 1977 1976 1976 1976 1976 1976 1976	21595. 20050. 16259. 14453. 13688. 13118. 13249. 11428. 11326. 11150. 11047. 10774. 10774. 10760. 10633. 10529. 9727. 9153. 8209. 8050. 7753. 6857. 6414.	2.08 4.17 6.23 10.42 10.558 114.67 118.75 118.75 118.75 119.75 11

*****	4426555	-1 -1 -1 -1 -1	1956 1957 1958 1959 1960 1961	11326. 5835. 2182. 3642. 5093. 3146.	* * * * * *	27 28 29 30 31 32	1964 1957 1939 1968 1976 1960	5942. 5835. 5576. 5278. 5275. 5093.	56.25 58.33 60.42 62.50 64.58 66.67
********	565454645	-1 -1 -1 -1 -1 -1 -1 -1	1962 1963 1964 1965 1966 1967 1968 1969	7753. 4432. 5942. 13688. 13118. 9153. 5278. 16259. 9727.	******	33 34 35 36 37 38 39 40 41	1936 1942 1955 1963 1937 1959 1940 1930	4903. 4743. 4722. 4432. 3931. 3642. 3322. 3229. 3146.	68.75 70.83 72.92 75.00 77.08 79.17 81.25 83.33 85.42
*****	10 5 4	-1 -1 -1 -1 -1 -1	1971 1972 1973 1974 1975 1976	13078. 11047. 8209. 10633. 20050. 5275.	***	42 43 44 45 46 47	1935 1932 1933 1931 1958 1934	2987. 2784. 2657. 2323. 2182. 1984.	87.50 89.58 91.67 93.75 95.83 97.92

C

	****	*****	DNS- ANDKA		*****	*******	*******
k	EVI	ENTS AN	ALYZED	*	ORD	ERED EVENTS	*
ķ				*	WATER		WEIRULL *
k WOW	DAY	YEAR	FLOW, CFS	* RANK	YEAR	FLOW, CFS	PLOT FOS *
8	-1	1930	1052.	* 1	1934	810.	2.08 *
9	-1	1931		* 1 * 2 * 3	1936	827.	4.17
16	-i	1932	1263.	* 3	1933	827. 972.	6.25
1 9	-1	1933		* 4	1976	1048.	8.33 *
8	-1	1934	810.	* 5	1930	1052.	10,42 *
1	-1	1935	1087.	* 6	1935	1087.	12.50 *
k 7	-1	1936		* 7	1932	1263.	14.58 *
7 2 10	-1	1937		* 8	1931	1347. 1371.	12.50
10	-1	1938		* 9	1940	13/1.	18.75 * 20.83 *
10 7	-1 -1	1939 1940	1901. 1371.	* 10 * 11	1937 1961	1379. 1642.	20.83 *
8	-i	1941	2927.	* 11 * 12 * 13	1970	1858	22.92 * 25.00 * 27.08 *
i	-i	1942	2827. 3568.	¥ 13	1939	1858. 1901.	27.08
1 12	-î	1943	3690.	* 14	1960	1977.	29.17
K 1	-i	1944	4203.	* 15	1948	2067.	29.17 * 31.25 *
k 1	-1	1945	4300.	* 16	1967	2219.	
k 9	-1	1946	3575.	* <u>17</u>	1959	2381.	35.42 *
8	-1	1947		* 18	1962	2449.	37.50 *
10	-1	1948	2067.	¥ 19	1956	2453.	39.58 *
9	-1 -1	1949 1950	2506. 3233.	* 19 * 20 * 21	1938 1949	2502. 2506.	41.67 * 43.75 *
	-1	1951	4115.	* 20 * 21 * 22 * 23 * 24 * 25	1964	2521.	37.50 * 39.58 * 41.67 * 43.75 * 45.83 *
11	- i	1952	3440.	* 22 * 23	1958	2530.	47.92
i	-ī	1953	4831.	¥ 24	1969	2665.	50.00 *
12	-ī	1954	4178.	¥ 25	1963	2822.	52.08 *
k 11	-1	1955		* 26	1941	2827.	54,17 *
10	-1	1956	2453.	* 27	1965	3090.	56.25 * 58.33 *
1	-1	1957	3282.	* 28 * 29 * 30	1968	3095.	58.33 *
8	-1	1958	2530.	¥ 29	1955 1971	3120.	60.42 *
1	-1 -1	1959	2381	* 30 * 31	1971 1974	3126. 3159.	62.50 * 64.58 *
8	-1	1960 1961	1977. 1642.	* 31 * 32	1947	3214.	66.67 *
ž	-1	1962	2449.	* 31 * 32 * 33	1950	3233.	66.67 * 68.75 *
11	-i	1963	2822.	* 34	1957	3282.	70.83 *
8	-1	1964	2521.	* 35	1952	3440.	72.92 #
3	-1	1965	3090.	* 36	1942	3568.	75.00 * 77.08 *
12	-1	1966	4969.	* 37	1946	3575.	77 • 08 · *
11	-1	1967	2219.	* 38	1943	3690.	79.17 *
1	-1	1968	3095.	* 39	1951	4115.	81.25 * 83.33 *
9	-1 -1	1969 1970	2665. 1858.	* 40 * 41	1954 1944	4178. 4203.	83.33 * 85.42 *
9	-1	1971	3126.	42	1945	4300.	87.50 ¥
12	-1	1972	6905	43	1973	4535.	89.58
7	-î	1973	4535.	* 44	1953	4831.	89.58 * 91.67 *
9	-i	1974	3159.	¥ 45	1966	4969.	93.75 *
1 9 9 9 12 7 9 3 9	-1	1975	5027	* 46	1975	5027.	95.83 *
9	-1	1976	1048.	4 47	1972	6905.	97.92 *

APPENDIX M

PLAN 10

SANDY LAKE PLAN COMPUTATIONS

APPENDIX M PLAN 10 - SANDY LAKE PLAN COMPUTATIONS

A hand routing procedure can be performed for a the daily flow event in order to evaluate Sandy Lake Reservoir operation based upon Plan 10 criteria. The HEC-5 computer results from Plan 1 - Present Operating Plan provide the flow hydrographs at Libby and inflow to Sandy Reservoir plus Sandy Reservoir operation results up to the period when the Plan 10 criteria (open gates) is initialized. The following figures provide the rating curve used at Libby and the slope rating curve used at Sandy River below the dam. The computation procedure follows:

COMPUTATION PROCEDURE

Column

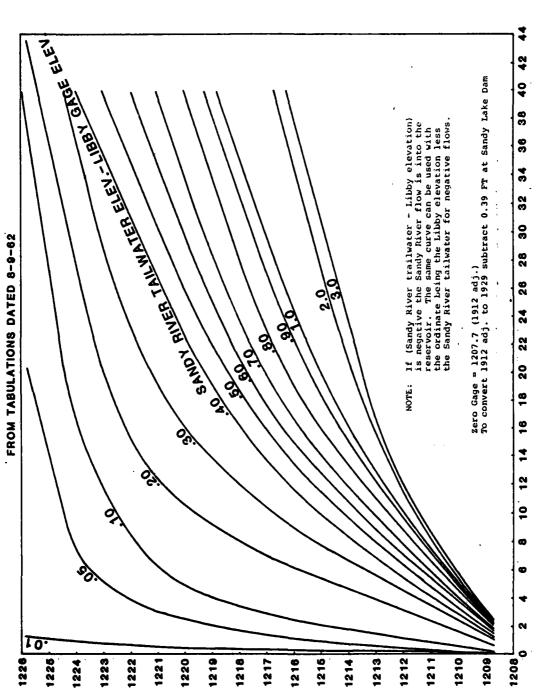
- (1) Hydrograph Period (Daily)
- (2) Total Regulated Flow at Libby: HEC-5 results "LIBBY FLOW REG"
- (3) Elevation at Libby: Using (2) discharge and Rating Curve at Libby
- (4) End of Period Storage at Sandy: Previous period (4) minus this period (10). Note: first value is initial storage for Sandy for this flood event as specified on HEC-5 R1 card
- (5) End of Period Elevation at Sandy: using (4) storage and storage-elevation curve at Sandy
- (6) Elevation: (5) for previous period minus (2) for this period. Note: for purpose of this hand routing this elevation is assumed to be constant over entire period.
- (7) Inflow at Sandy for this Period: HEC-5 results "LIBBY LOCAL CU"
- (8) Total Outflow at Sandy Assuming Open Gates with Current Discharge/Elevation Conditions at the Mississippi River at Libby and Elevation at Sandy Reservoir: Use slope rating curve Sandy River, Sandy Lake Dam and Reservoir with "ELEVATION SANDY RIVER TAILWATER" = (5) for previous period and appropriate curve based on (6) for this period.
- (9) Specified Actual Outflow at Sandy: as per normal operation, see HEC-5 results "SANDY RE OUTFLOW" until gates opened, then (8)
- (10) Change in Storage during this Period: $S=[(I-0)/\Delta I]$, [(7)-(9)]/1.983

NOTE: All elevations 1929 adj, flow in cfs, storage in ac-ft

SANDY RIVER - SLOPE RATING CURVE SANDY LAKE DAM & RESERVOIR 27 JAN 66

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C



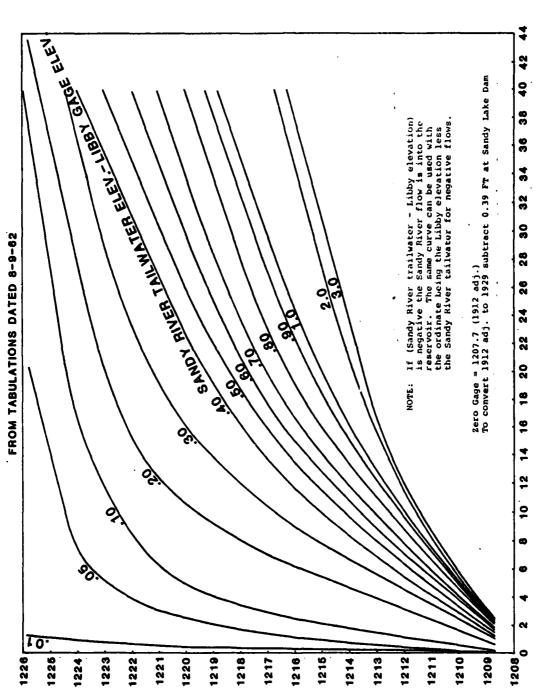
ELEVATION SANDY RIVER M.S.L. (1912 ADJ.) TAILWATER

SANDY RIVER DISCHARGE IN 100 SECOND-FEET

SANDY RIVER - SLOPE RATING CURVE SANDY LAKE DAM & RESERVOIR 27 JAN 66

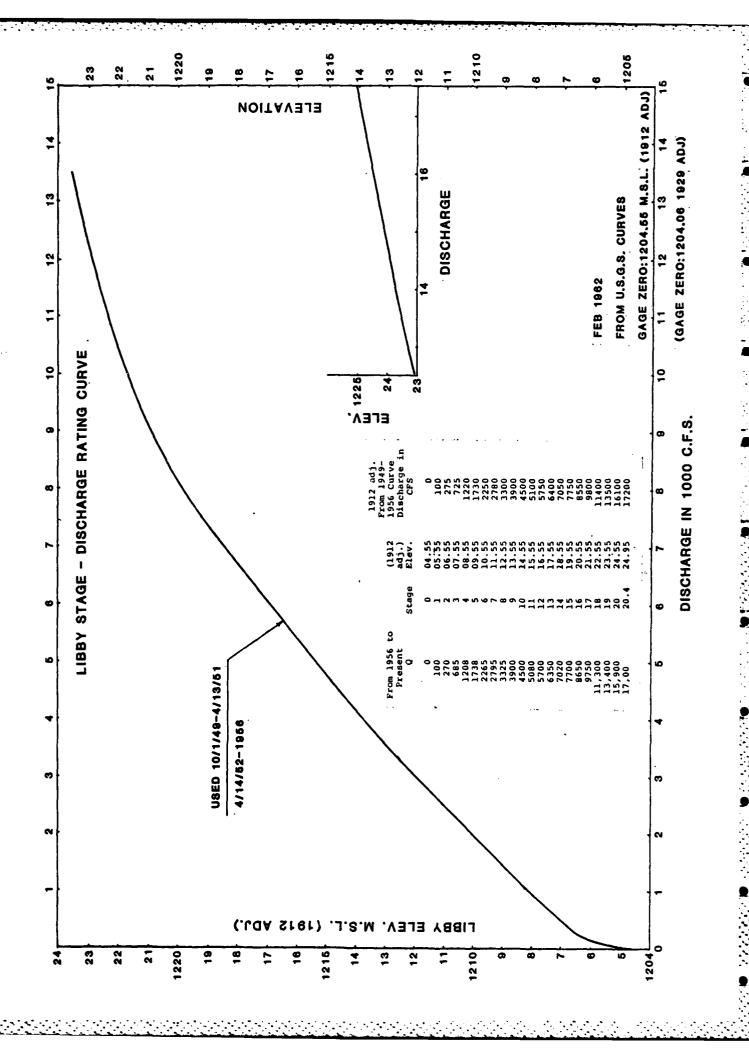
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ELEVATION SANDY RIVER M.S.L. (1912 ADJ.) TAILWATER

SANDY RIVER DISCHARGE IN 100 SECOND-FEET



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